SIEMENS

SIMOMED

SP

Service Instructions

Monitor 44 cm

100/120 Hz

11 02 628 X2080 625/525 lines From serial no. 02593

60 Hz

11 02 917 X2079 525 lines From serial no. 01188

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English

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General information

Before starting work, make sure that the part number of the monitor corresponds with the number of the instructions.

- Type X2080 monitors can be operated at 100 and 120 Hz and type X2079 at 50/60 Hz without changing the video standard.
  Voltage: when delivered = 230 V +10% / -15%
  (can be switched to 115V+10% / -15%).
- The monitor is adjusted with a functioning Memoskop. If this is not available, the test pattern of the Multinorm test box (refer to "Measuring instruments and auxiliary devices"), the corresponding digital system, or the Videomed D can be used, if necessary.
- Except for the luminance, adjustments are required only after replacing a module or picture tube.
- The maximum luminance influences the image quality to a considerable extent. If after a lengthy operating time, the luminance does not attain a maximum of $\geq$ 300 cd/m^2, replace the picture tube.
- When adjusting luminance, check the luminance of the second monitor as well.

Service

Repairs are limited to replacing modules.

Individual parts for PC boards are not available.

Parts available for delivery are shown in the spare parts list.

- Test templates are included in the appendix. Their purpose is to simplify service. The test template is fastened onto the picture tube to adjust the image geometry. If the image geometry is correctly adjusted, the intersections of the grid lines must be located within the rings. Otherwise, adjust the image geometry in accordance with Chap. 4.

Safety information

Re: DHHS requirements

- DHHS requirements are met via factory adjustment of the PC boards.
  - Do not replace components or make circuit modifications on the PC boards. Always replace PC boards when servicing the system.
  - After replacing the power pack board SV1, check the voltage U = 48 V ± 0.5 V at TP “9”.
    Ensure compliance with the tolerances.
    This ensures compliance with DHHS requirements.
- Protection: IEC 601, protection class I, (with protective conductor) unit type B IP 20 with reinforced insulation for primary/secondary (4 kV).
- Interference suppression: acc. to VDE 0871, Part 2, limit value B, acc. to VDE 0871, Part 3, interference suppression grade N,
- Comply with the safety-technical information in TI 236 “Safety regulations for installation and maintenance.”
- Check that the monitor mounting and hardware are secure and show no signs of damage.

CAUTION **Disconnect the power plug before removing the cover. Electric shock hazard exists when the unit is still connected.**

Observe the safety instructions according to theTI folder Register 2 (replaced by ARTD, Part 2, ARTD-002.731.12.01) due to the risk of implosion of the picture tube.

When handling PC boards, observe the ESD directives according to TI 219.

To comply with EMC regulations, ensure that shielding plates for the PC boards are mounted correctly.

After completing all work and attaching the hood, test the protective conductor according to TI 236, document number RA0-000.12.20... (replaced by ARTD, Part 2, ARTD-002.731.17.01)

Maintenance

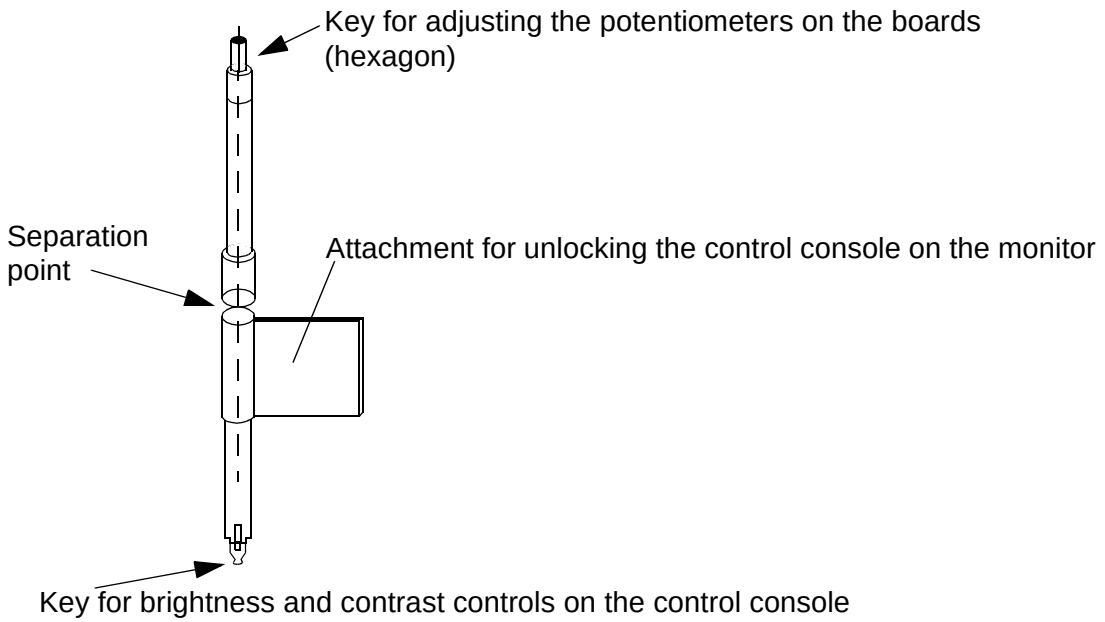
- The picture tube parameters change with increasing time of operation. This affects the luminance and the brightness and/or the contrast setting. For this reason, the luminance has to be tested every 12 months according to chapter 6-1 and, if necessary, the video amplifier setting has to be performed according to pages 5-1 through 6-5.
- The inner part of the monitor should be cleaned with compressed air from time to time depending on the amount of dust in the operating rooms.
  In order to recognize parameter deviations, the image quality test for the specific system must be performed every 12 months according to the IQ instructions.
  If deviations in sharpness and geometry are found, correct them according to the service instructions.

Required documents

- Operating instructions for the X-ray system to which the SIMOMED monitor is connected.
- Wiring diagrams of the corresponding SIMOMED, type X2079 or X2080
- IQ Instructions for the X-ray system used.
- Operating Instructions for the Monitor-Multinorm Testbox (included with the unit)
- Operating Instructions for the Mavo-Monitor (included with the unit)
- Safety-technical Instructions. RA0-000.012.20... and the instructions “Handling of vacuum container” TI 201 from TI-folder part 2, replaced by ARTD, Part 2, ARTD-002.731.12.01.
- Spare parts list RA 52-060.081...

Measuring instruments and auxiliary devices

- Oscilloscope, 100 MHz
- Probe 10 :1
- Digital multimeter, e.g. Fluke 8060A
- Monitor Multinorm Testbox 97 16 754 Y4905 (only if MEMOSKOP 2000 with keyboard is not available)
- High-voltage probe 1 GΩ (1000 :1)
- MEMOSKOP keyboard (part of X-ray system)
- Mavomonitor luminance measuring instrument (direct order, see ARTD, group TD36)
- Protective conductor tester, 44 15 899 RV090
- TORX offset screwdriver kit 99 00 663 GE999
- Auxiliary tool (service key, included with the monitor)
  - for unlocking the control console
  - for adjusting the contrast control on the monitor
  - for adjusting the brightness control on the monitor.


Key for adjusting the potentiometers on the boards (hexagon)
Separation point
Attachment for unlocking the control console on the monitor
Key for brightness and contrast controls on the control console

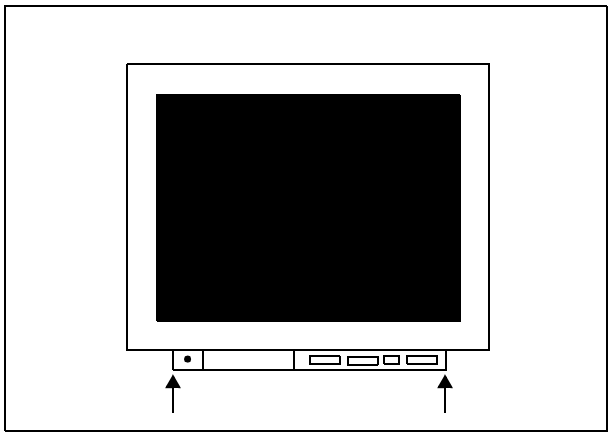


Fig. 1

Removing the PC boards

- Remove the two back mounting screws on the monitor housing.
- Remove the housing.
- Remove the two screws on the rear cover plate.
- Swing the cover plate to one side and remove it.
- Remove the three remaining screws and remove the top cover plate.
- Remove the cover from above the video connections (3 screws).
- Remove the bottom mounting screw on the left-hand SV board (power pack board).
- Remove the center mounting screw on the right-hand AP board (sweep board).
- Take out the two boards and hook them onto the supports provided from the outside with the plastic pins, ensuring that the components face inward.
- Loosen the screw and pull out the video amplifier board and hook it into the locking position required.

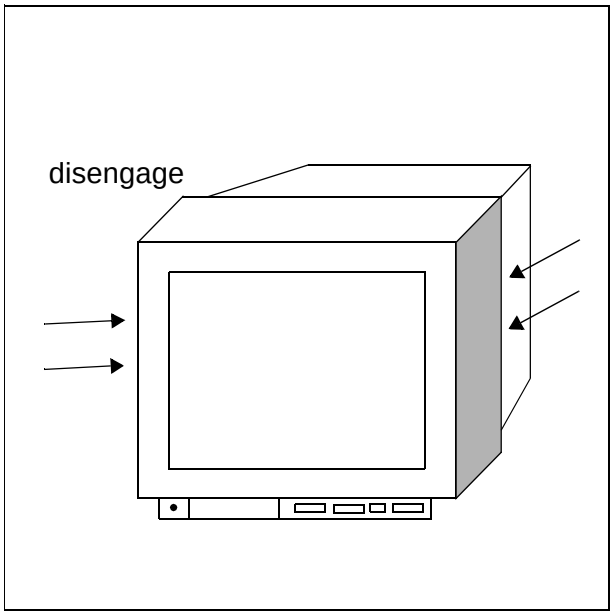
Removing the control panel

- Use the plastic service key packed with the monitor.
- Push the service key tongue from underneath into the slots provided on the left and right of the control panel (↑/Fig. 1) and disengage the control panel.

Removing the picture tube

(including sweep unit [1])

- Remove the PC boards and the control panel as described above.
- Disengage the front frame of the picture tube by slightly pulling the right and left side panels apart and removing the frame toward the front.



From the picture tube, remove the

- base board connection
- neck shielding plate connection
- ground connection of the picture tube outer covering
- sweep unit connection
- high-voltage clip

- Loosen the picture tube and the sweep unit [1] with the four slotted screws on the front[2].

CAUTION

1) The sweep unit should remain on the picture tube.
2) Do not adjust the (hexagonal) spacer nuts since they have been adjusted in the factory.

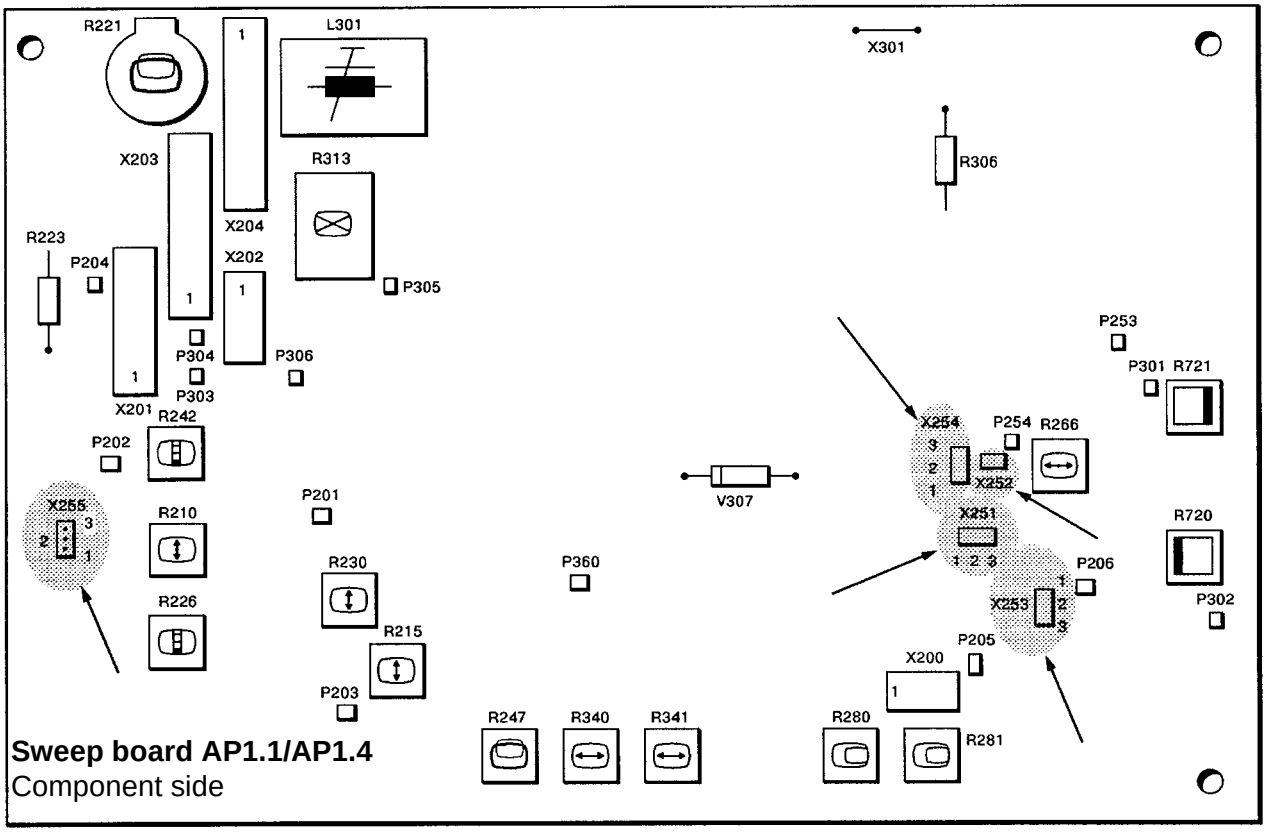
- Pull the picture tube back slightly.
- Loosen the two flat plugs of the antistatic connection.
- Remove the entire picture tube after taking out the 4 screws.

Installing the picture tube

- Reinstall the picture tube according to the above instructions (in reverse order) and connect it.

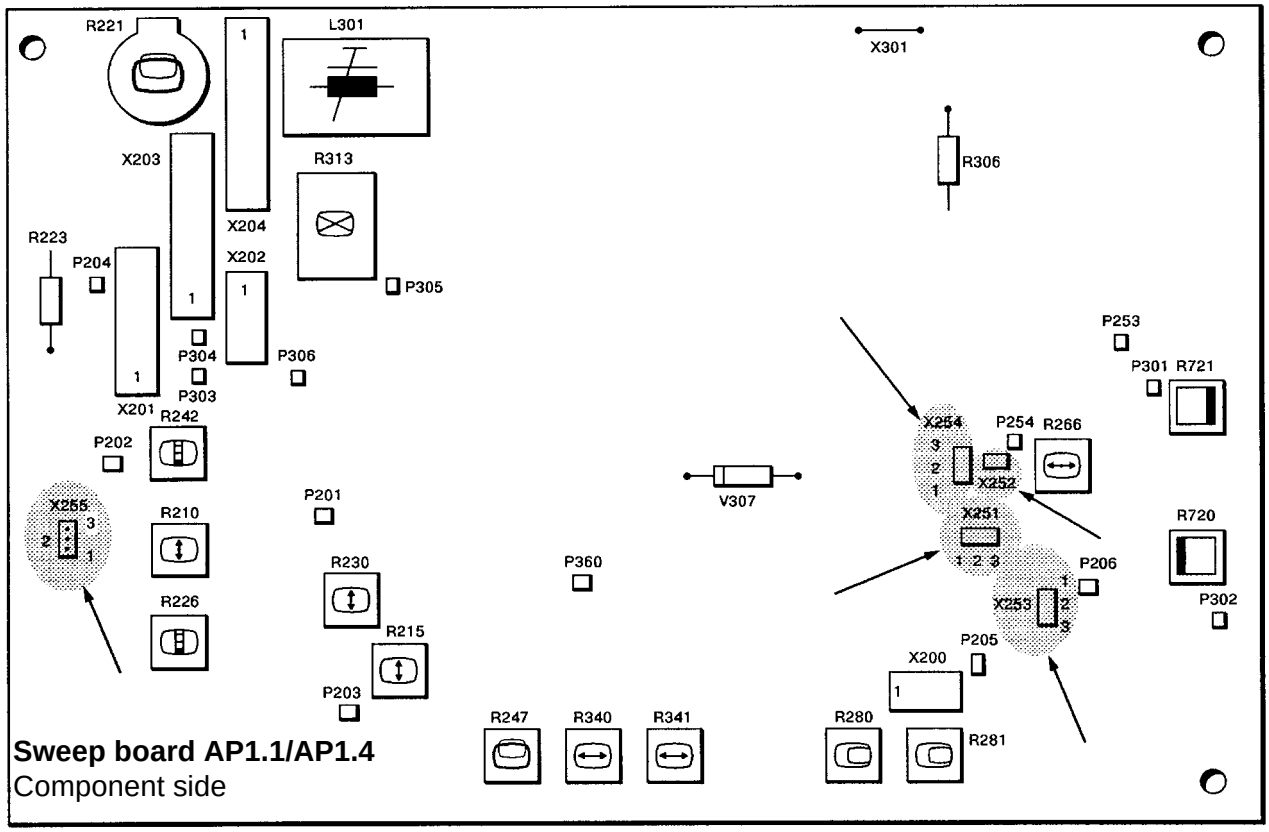
NOTICE

- **Check the flat plugs of the antistatic connections for proper contact; otherwise, there is a risk of electric shock.**
- **After reconnecting, adapt the video amplifier (VV board) to the new picture tube as described on page 6-1.**



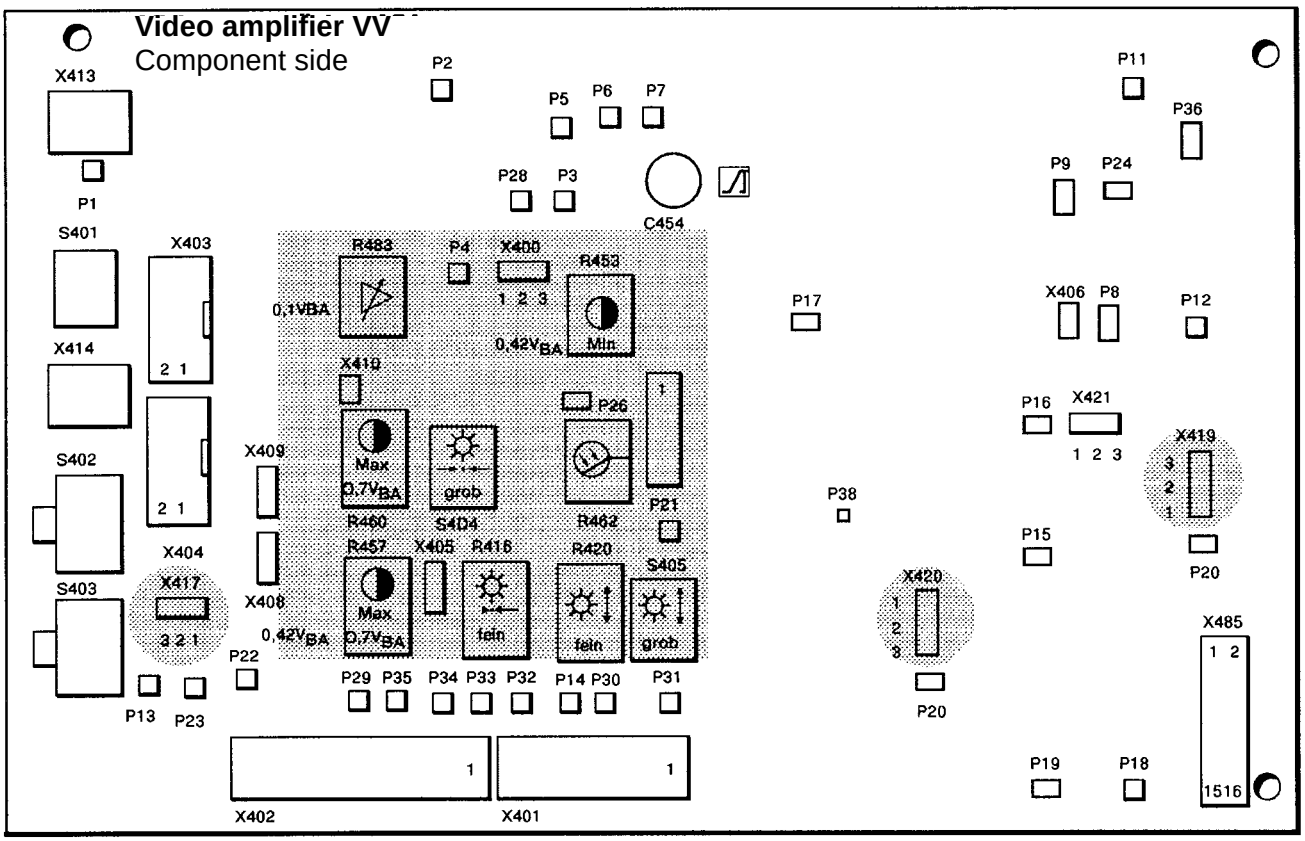
Sweep board AP1.1/AP1.4
Component side

		Jumper coding on the sweep board C79145-A3058-D913	Preset
X251	1 2 3	Mute = synchronization-dependent standby; not used here	
	1 2 3	not used	**X**
X252	1-2	f_H-adjustment; only closed during adjustment	**open**
X253	open	With board C79145-A3058-D913 open	**open**
X254	1 2 3	Normal operation	
	1 2 3	Video recorder operation	**X**
X255	1 2 3	100/120 Hz or 50/60 Hz automatic standard switchover enabled	**X**
	1 2 3	Standard switchover 100 or 50 Hz fixed	

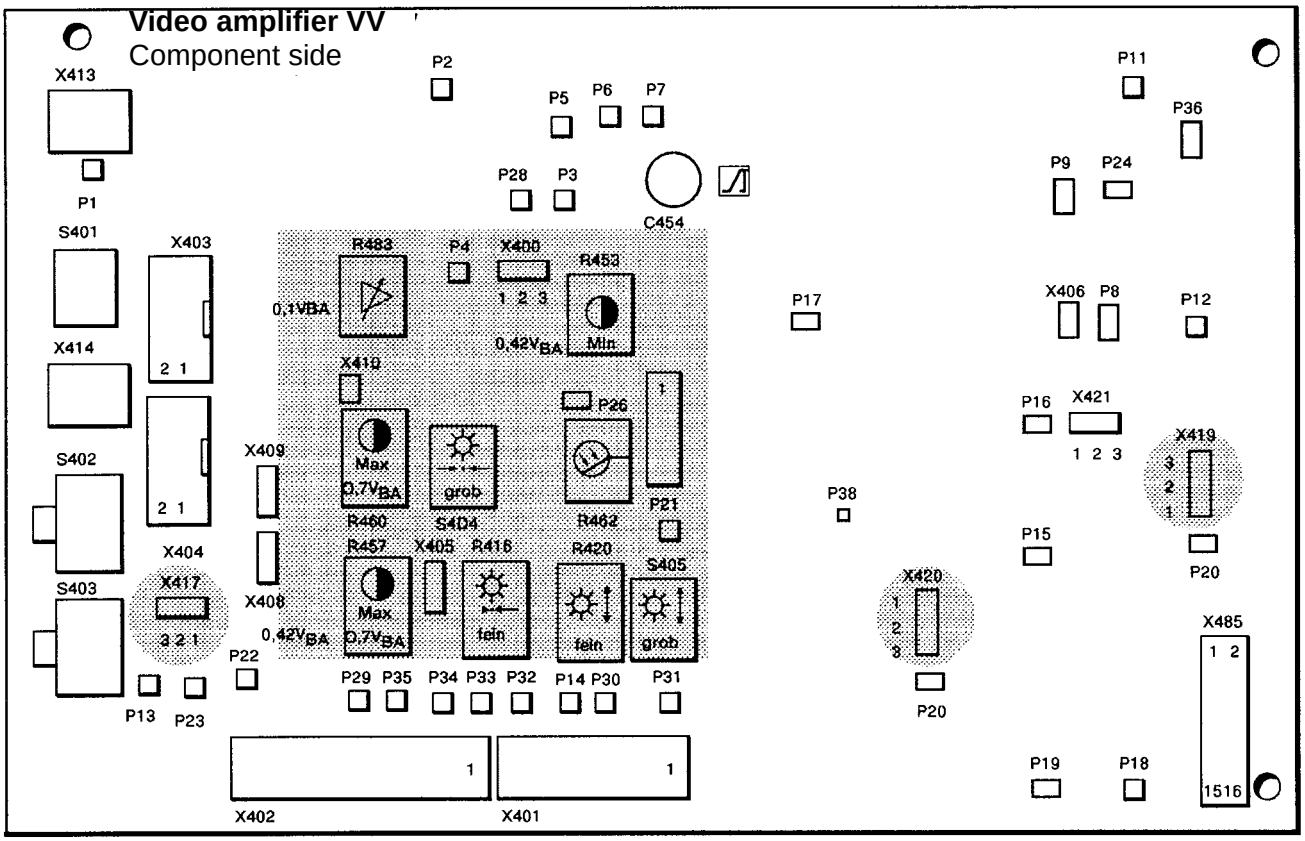


Sweep board AP1.1/AP1.4
Component side

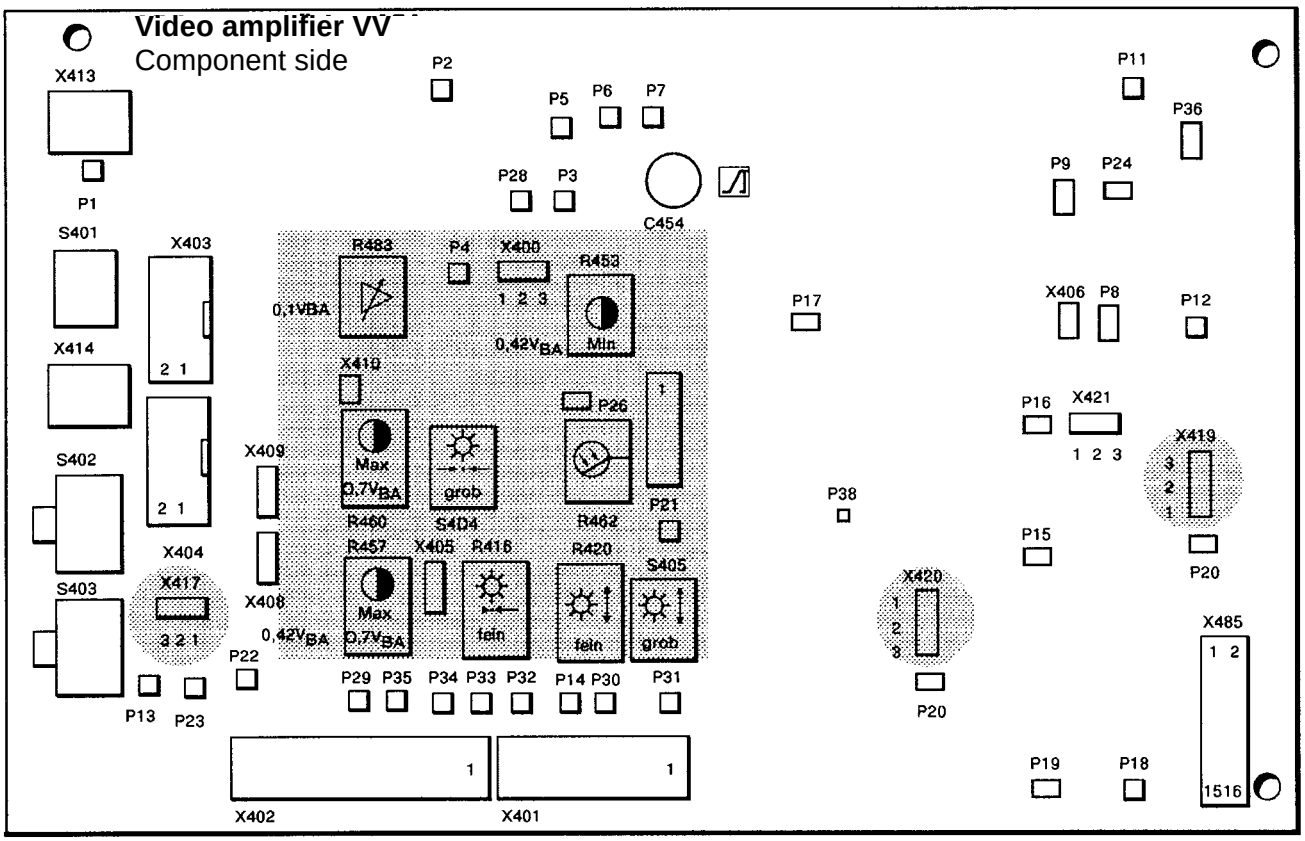
		Jumper coding on the sweep board C79145-A3058-D915	Preset
X251	1 2 3	Mute = synchronization-dependent standby; not used here	
	1 2 3	not used	**X**
X252	1-2	f_H-adjustment; only closed during adjustment	**open**
X253	1 2 3	Clamping ON	**X**
	1 2 3	Clamping OFF	
X254	1 2 3	Normal operation	
	1 2 3	Video recorder operation	**X**
X255	1 2 3	100/120 Hz or 50/60 Hz automatic standard switchover enabled	**X**
	1 2 3	Standard switchover 100 or 50 Hz fixed	



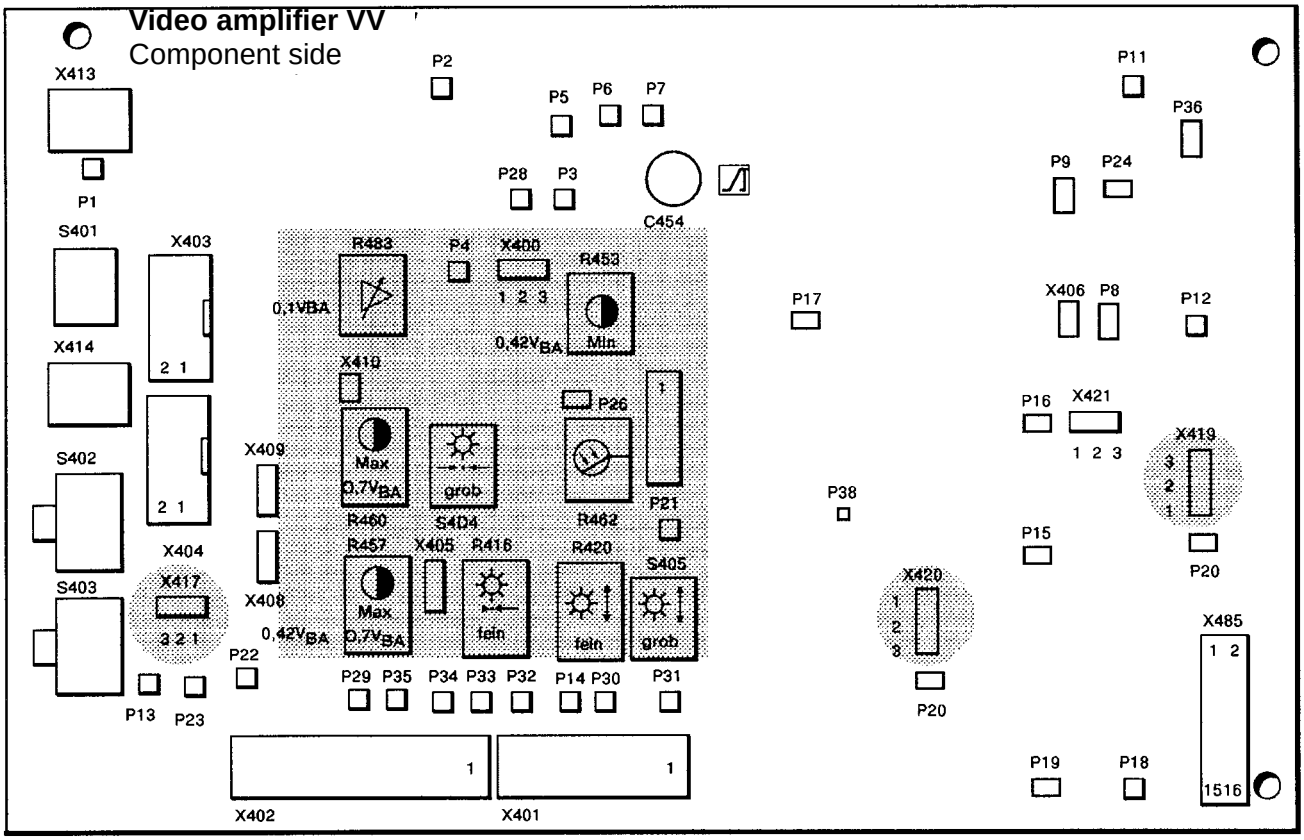
		Jumper coding on the video amplifier for Monitor 11 02 917 X2079 (50/60 Hz)	Preset
X417	3 2 1 ● ▬ ▬	Only external or internal ☼ / ◑ operation	**X**
	3 2 1 ▬ ▬ ●	External or internal selection via remote control switch on the monitor (option)	
X419	3 2 1 ● ▬ ▬	Room lighting sensor "⊙"	**X**
	3 2 1 ▬ ▬ ●	Room lighting sensor "SERVICE"	
X420	3 2 1 ● ▬ ▬	Brightness "fine" (range 4 - 7 V)	
	3 2 1 ▬ ▬ ●	Brightness "coarse" (range 0 - 10 V)	**X**
		continued on page 1-10	



		Jumper coding on the video amplifier for Monitor 11 02 917 X2079 (50/60 Hz)	Preset
X421	1 2 3 ● ● ●	Contrast “fine” (range 4 - 7 V)	
	1 2 3 ● ● ●	Contrast “coarse” (range 0 - 10 V)	**X**
S402	1	Video ground isolated from protective conductor	**X**
	2	Video ground connected to protective conductor	
S403	1	Internal ☼ / ◑ setting for additional monitors	
	1 2 3 ● ● ●	External ☼ / ◑ setting in the monitor looped through	
S401	1 ▮ ○	no 75 Ω termination (video signal is forwarded)	
	▮ ⊙	75 Ω termination (video signal is not forwarded)	**X**
	2 ▮ ○	without black level clamping	
	▮ ⊙	with black level clamping	**X**
	3 ▮ ○	Gain “High”	
	▮ ⊙	Gain “Low”	**X**
	4 ▮ ○	Room lighting sensor disabled	
	▮ ⊙	Room lighting sensor enabled	**X**



		Jumper coding on the video amplifier for Monitor 11 02 628 X2080 (100/ 120 Hz)	Preset
X417	3 2 1 ● ▬ ▬	Only external or internal ☼ / ◑ operation	**X**
	3 2 1 ▬ ▬ ●	External or internal selection via remote control switch on the monitor (option)	
X419	3 2 1 ● ▬ ▬	Room lighting sensor "⊙"	**X**
	3 2 1 ▬ ▬ ●	Room lighting sensor "SERVICE"	
X420	3 2 1 ● ▬ ▬	Brightness "fine" (range 4 - 7 V)	
	3 2 1 ▬ ▬ ●	Brightness "coarse" (range 0 - 10 V)	**X**
		continued on page 1-12	



		Jumper coding on the video amplifier for Monitor 11 02 628 X2080 (100/ 120 Hz)	Preset
X421	1 2 3	Contrast “fine” (range 4 - 7 V)	
	1 2 3	Contrast “coarse” (range 0 - 10 V)	**X**
S402	1	Video without protective conductor	**X**
	2	Video with protective conductor	
S403	1	Internal ☼ / ◑ setting for additional monitors	
	1 2 3	External ☼ / ◑ setting in the monitor looped through	
S401	1	no 75 Ω termination (video signal is forwarded)	
		75 Ω termination (video signal is not forwarded)	**X**
	2	without black level clamping	
		with black level clamping	**X**
	3	Gain “High”	**X**
		Gain “Low”	
	4	Room lighting sensor disabled	
		Room lighting sensor enabled	**X**

Test patterns for X-ray systems with MEMOSKOP 3/50/SUB

Test patterns for the setting instructions and inspection of the monitor are selected with the MEMOSKOP keyboard.

If the keyboard, part no. 1102609, is not installed, it will be included for service in the delivery of the X-ray system.

- For this purpose, the keyboard has to be connected to the MEMOSKOP for service.
- Switch off the system.
- Remove the EMC cable shielding plate from the Memoskop.
- Connect the keyboard on plug panel ”X5”.
- Switch on the system.

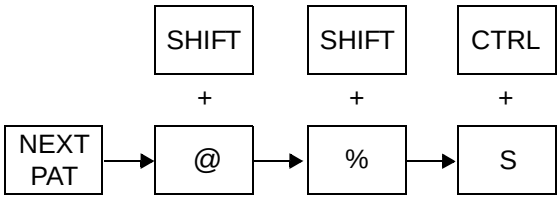
The following procedure is the same for systems with integrated and service keyboards.

Activating the service set-up mode.

- Switch on the system and wait until the MEMOSKOP warms up.

NOTICE	**<X> means press the key on the keyboard.** **<CTRL>+<E> means press both buttons at the same time.**

- Press the following keys on the MEMOSKOP keyboard one after another:



After the set-up mode is activated, a series of numbers will be displayed on the lower part of the screen. The test patterns can only be called up if the numbers are overwritten. Enter the numbers without blanks.

Make sure that you enter the correct numbers in order to avoid a system crash.

- Numbers printed in boldface type change the test pattern.
- To enter a new test pattern after the numbers have been changed, always press <CTRL>+<E> .
  It will then take approx. 20 seconds before the test pattern appears on the monitor.

Test patterns

SMPTE-similar	0000 8808 0A0303C F00
Gray notch horizontal	0000 8808 0A03021 C00
Black-white transition	0000 8808 0A03023 C00
Gray scale 0% - 100% (exponential)	0000 8808 0A03025 C00
Gray scale 0% - 100% (linear)	0000 8808 0A03026 C00
Black 0%	0000 8808 0A03027 C00
Vertical white bar 60%	0000 8808 0A03028 C00

- (After changing the test pattern code press <CTRL>+<E>).

Exiting the SETUP Mode

- After switching on and off, the memory returns to normal operation.

Test patterns of the Memoskop 3 / 50 / 100

Fig. 1

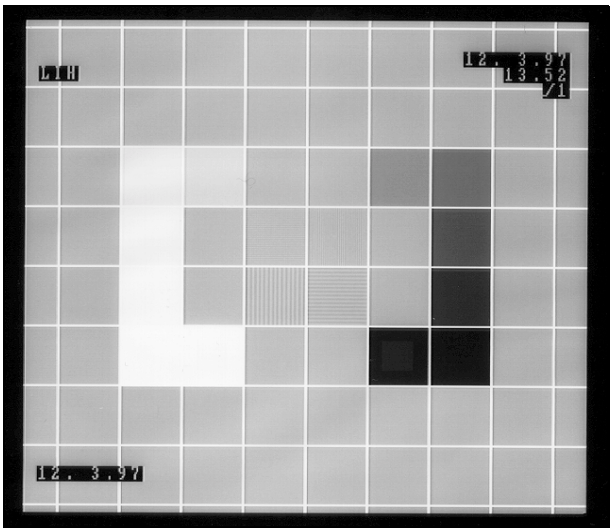


Fig. 2

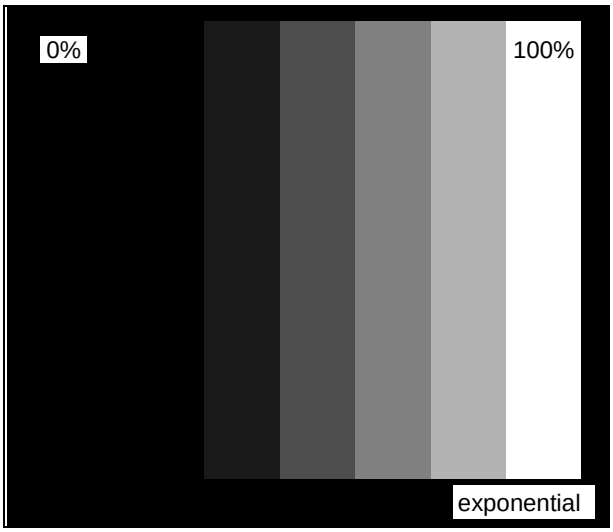


Fig. 3

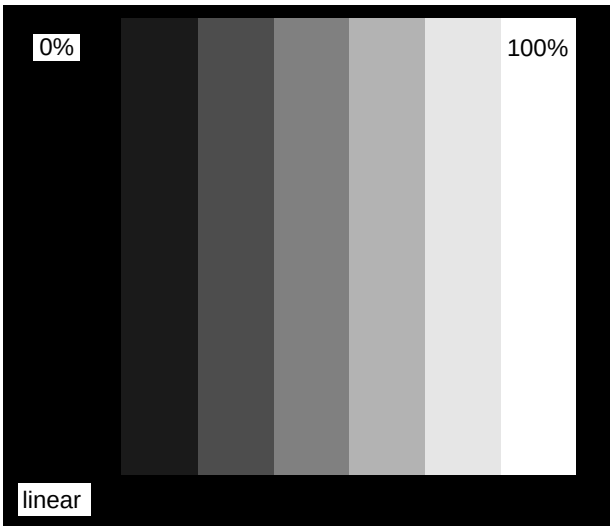


Fig. 4

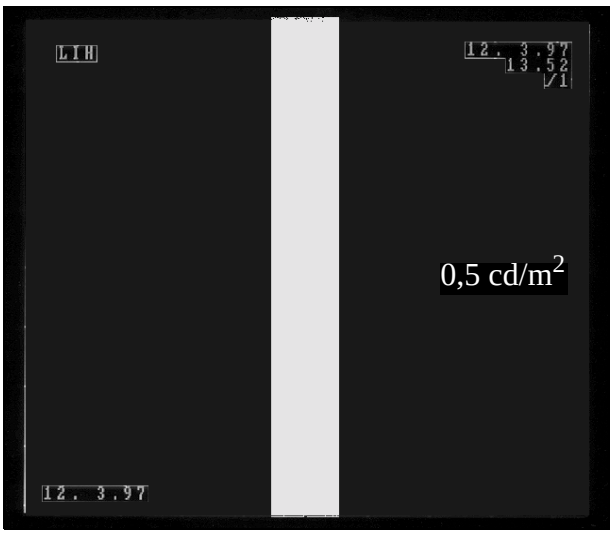


Fig. 5

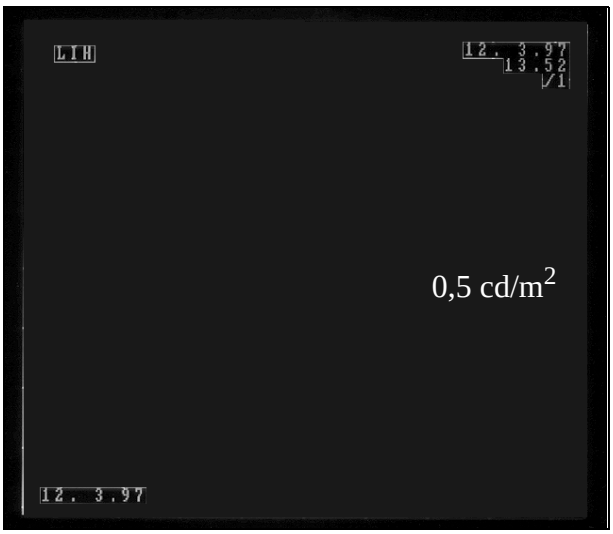


Fig. 6

Test patterns for X-ray systems with Memoskop C/C-E

Use the keyboard of the Memoskop C/CE to select test patterns in accordance with the setting instructions.
If there is no keyboard connected, the test patterns can be called up with the service PC (refer to the service instructions). To display the test patterns across the entire monitor screen, "circle mask enabled" can be temporarily programmed to "no".

- Call up technical Setup (simultaneously press the CTRL + T keys).
- Follow the menu guidance on the system monitor.
- Call up "Circle mask setup" and set "Circle mask enable" to "No" in the submenu.
- Call up "Test pattern generation" .
- Select the desired test pattern in the submenu and acknowledge by pressing the Return key.
- Select 4 and acknowledge with the Return key.
- Press the Home key 2 x to clear the menu text.
- After completing the adjustment, set "Circle mask enable" back to "Yes".

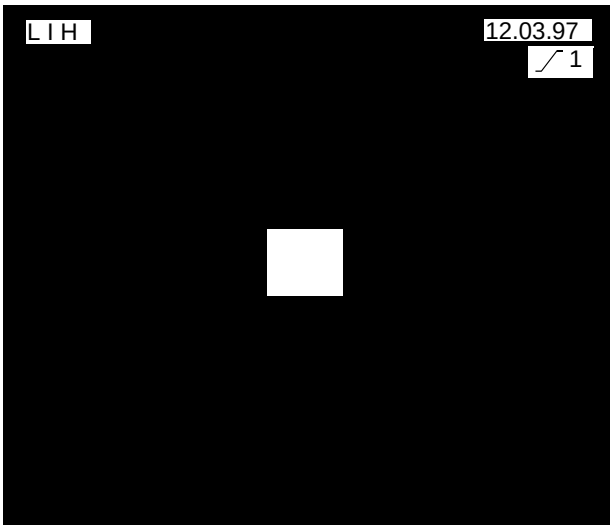


Fig. 7 square > VA00B
also available in SW version ... of Memoskop C/C-E

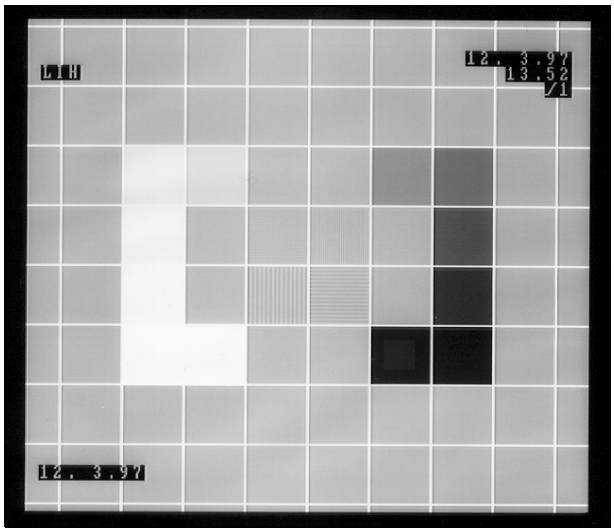


Fig. 8 SMPTE test pattern

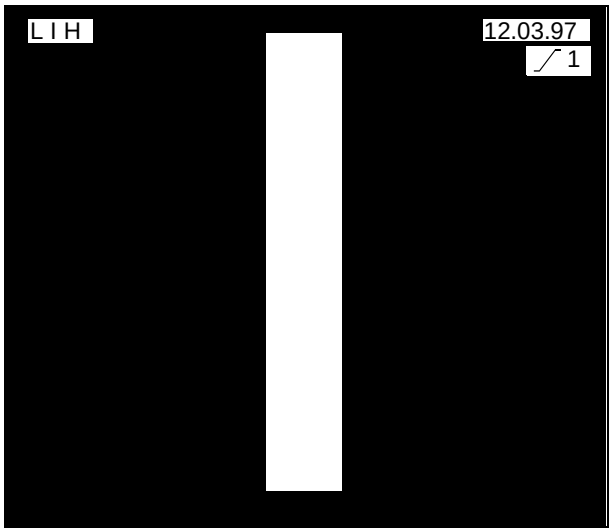


Fig. 9 vert beam

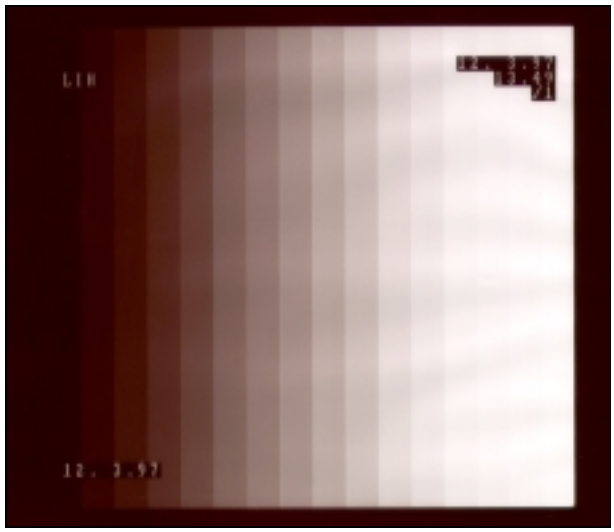


Fig. 10 grey steps

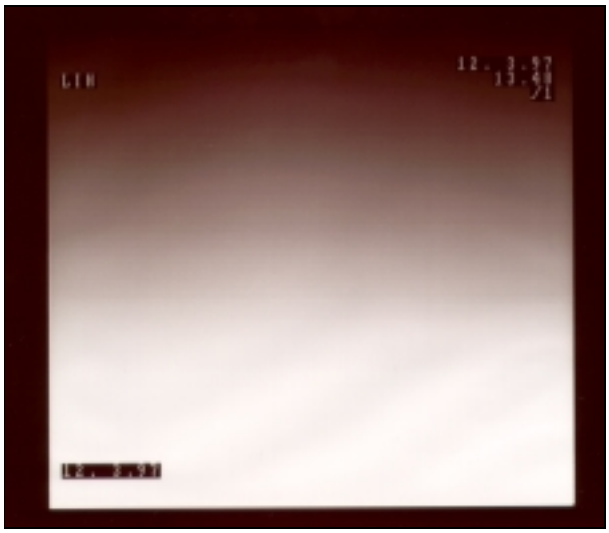


Fig. 11 vert ramp

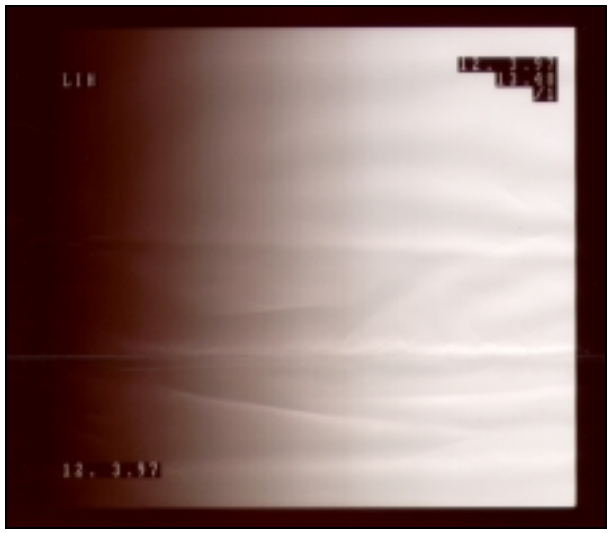


Fig. 12 hor ramp

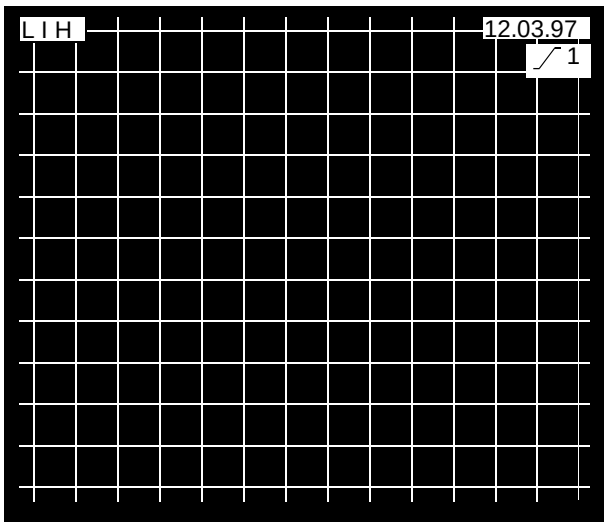


Fig. 13

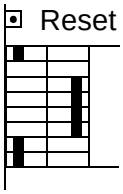
Test patterns in X-ray systems with VIDEOMED D only

Test patterns for Videomed D

Videomed D offers various test patterns for Service. The selection of test patterns depends on the switch combination S.1. on the D3 board.
The following test patterns can be called up in this operating mode.
Additional test patterns are described in the Service mode, page 2-4.
For the procedure for calling up the test patterns, refer to ”Special operating modes :.

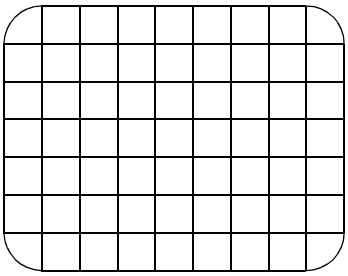
- Set the "test pattern signals" operating mode on the DIP switch.
- Actuate Reset
- Switch to the next images with each additional "Reset"
- For systems with MEMOSKOP, press "Test" on the MEMOSKOP.

D3 board in VIDEOMED D



Grid pattern

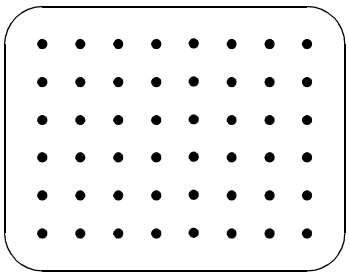
(aspect ratio 3:4)



For checking the image geometry/ position/amplitude

Dot pattern

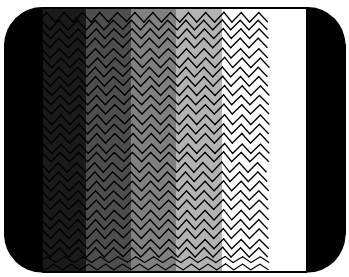
(aspect ratio 3:4)



For checking the image definition

Sawtooth
linear

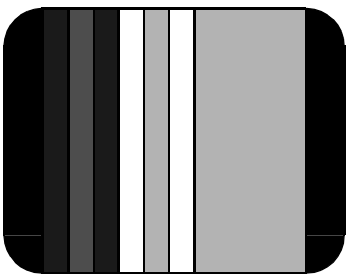
(aspect ratio 1:1)



Only for checking SW;
uses sawtooth for the
self-test during initialization

Grey shade test
0%/5%/0%/100%/95%/100%

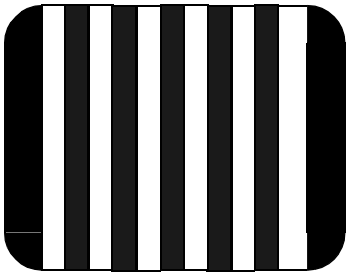
(aspect ratio 1:1)



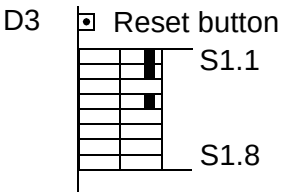
For adjusting monitor brightness and contrast

The following test signals can be selected directly via the DIP switch S1 on D3.

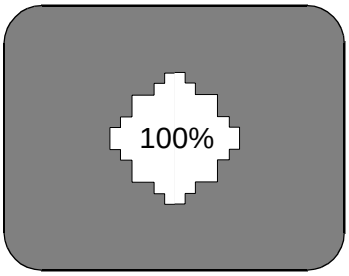
250 KHz signal



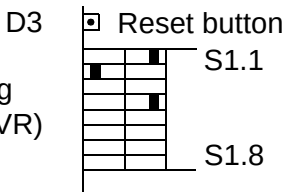
Calling up the test signals



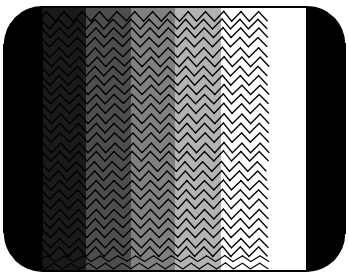
Currently selected measuring field

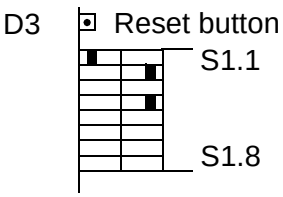


Collimation of measuring field dominants (ADR/AVR)

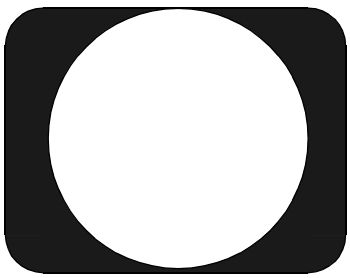


Sawtooth with gamma

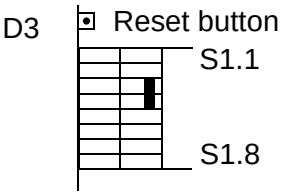




Circle



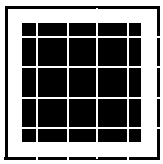
For checking centering

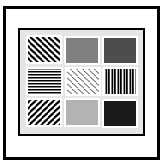


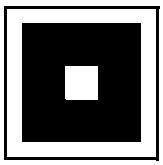
Set DIP switch S1 back to normal position (all switches to the left).

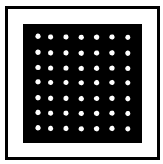
Using the monitor multinorm test box

- For installation and calling up the corresponding test pattern and/or standard, refer to the instructions for the monitor multinorm test box (included in delivery of the testbox).
- For adjusting the monitor, select ”System” (Text, SVHS...) in the ”Dialog Box”.
- 4 test patterns are available:


grid


grey scales


black/white


dots

For adjusting the necessary test patterns, refer to the corresponding text.

- The BAS values for the monitor multinorm testbox defined as default values are valid for the adjustment of the monitors.

Selection of test patterns on the SIREMOBIL 2000

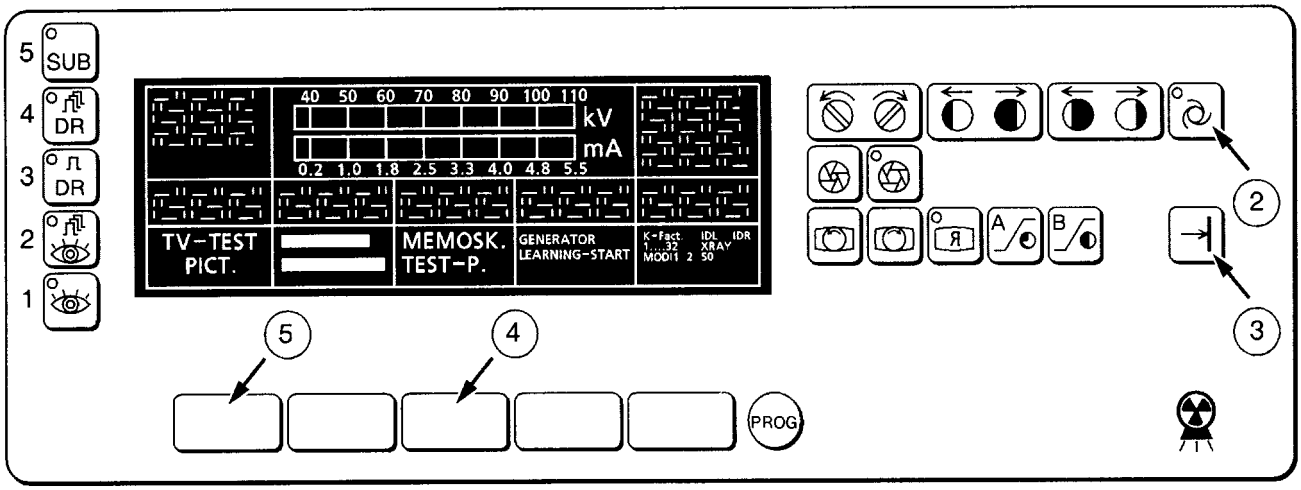


Fig. 14

- Successively press the following controls on the Siremobil control console and hold them down:
  1. ATB button on the hand control switch
  2. Key (2/Fig. 14) on the control console
  3. →| Multiformat camera trigger key (3/Fig.14)

Release all controls after approx. 1 second.
The ”Internal service menu” will then be displayed on the operating console (Fig. 14).

Stored test patterns

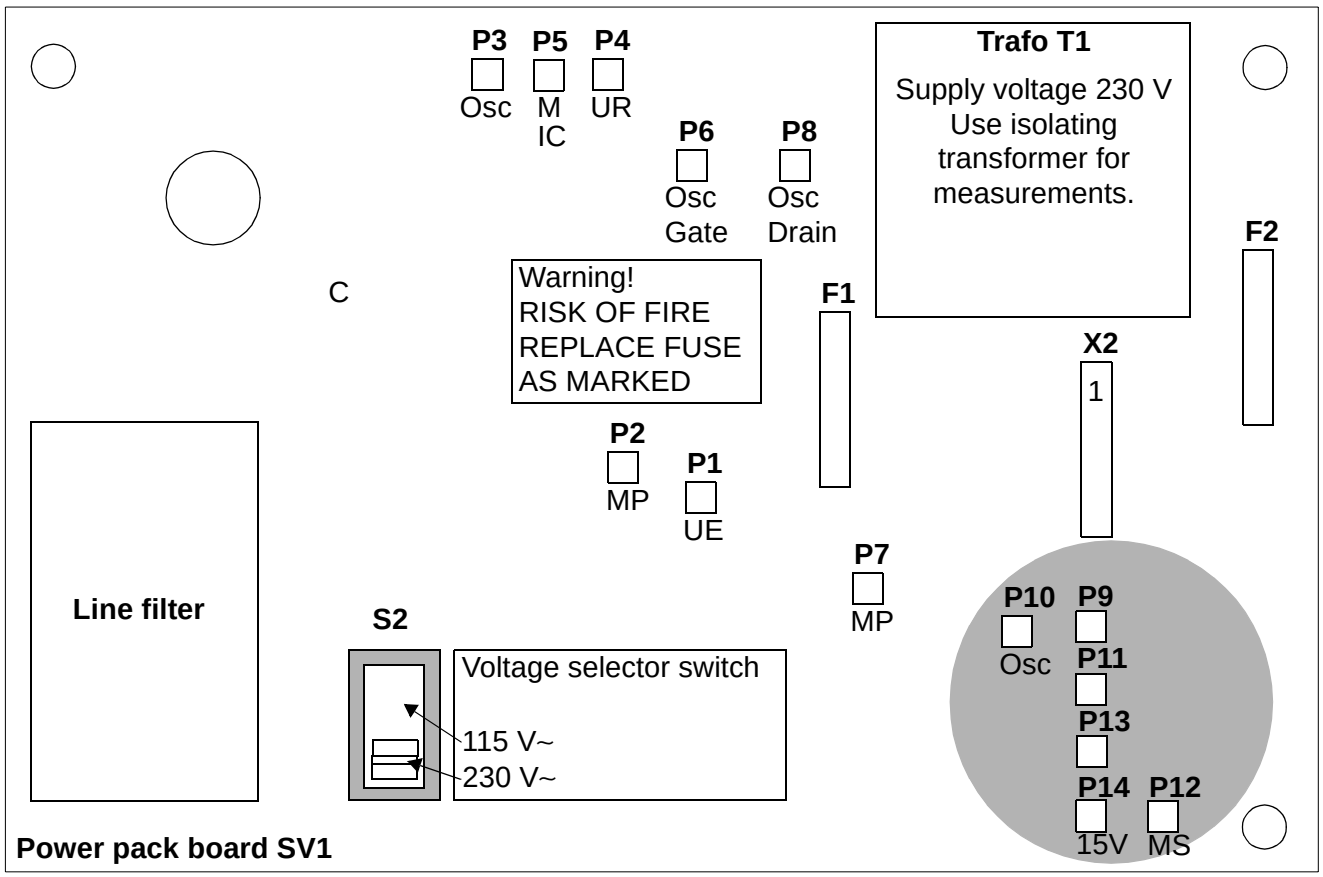
- Press the third key (soft key, 4/Fig. 14) on the control console and wait for the stored test pattern to be reconstructed (about 15 seconds).
- Page through the stored test patterns by pressing the third soft key (4/Fig. 14). The reconstruction of each test pattern takes approx. 15 seconds.
- **Exit the service** menu by pressing the same sequence of keys as when selecting.

TV test patterns (= camera test patterns)

- Press the first key on the control console and wait for the TV test pattern to be reconstructed (about 15 seconds).
- Page through the TV test patterns by pressing the first soft key (5/Fig. 14).

  The following test patterns can be selected for TV test purposes:
  grid, dots, 250 kHz, 15 kHz, 50 Hz, center marking, empty circle, sawtooth.
  The remaining test patterns are not required.
  After paging through the test patterns, the sequence is repeated.
- **Exit the service menu** called last by pressing the same sequence of keys as when selecting.

Changing over the supply voltage on power pack board SV1.2



Changing over the supply voltage from 230 V to 115 V

Supply voltage, preset: U_N = 230 V, +10 / - 15 %

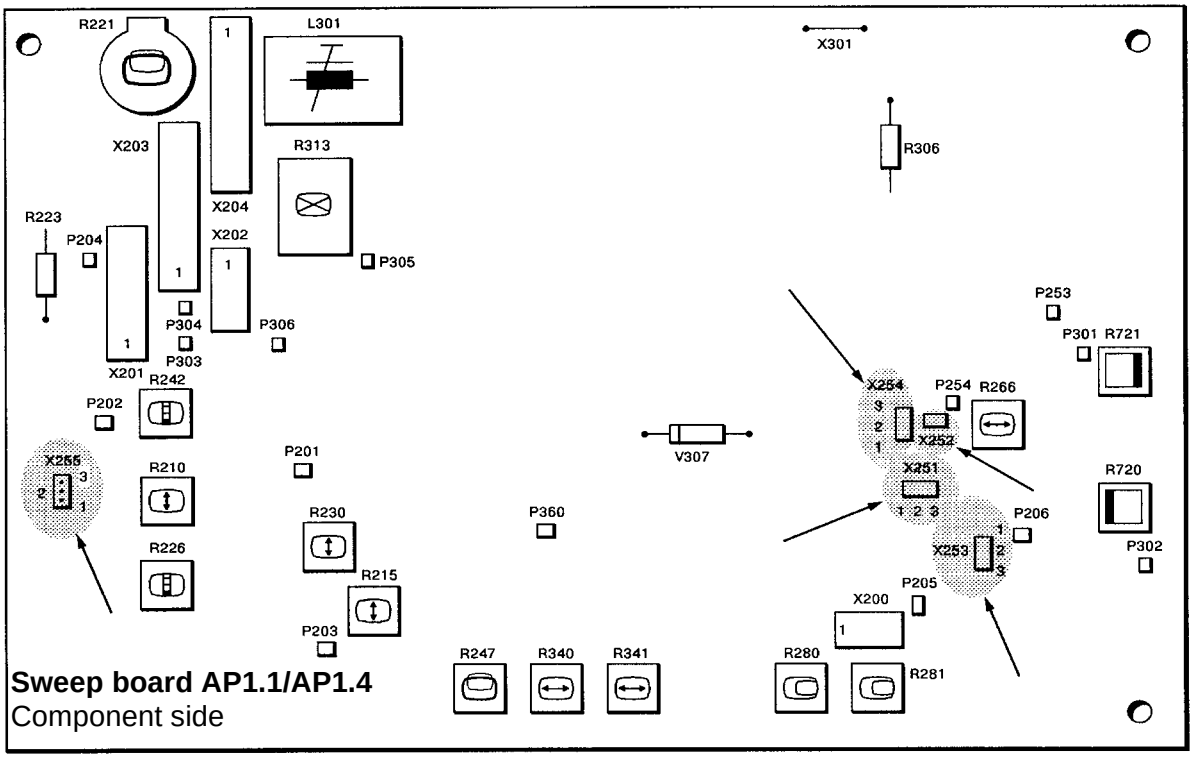
Accuracy of voltmeter: 1.5 %

- Set switch S2 on PC board SV1 to 115 V.
- Take the appropriate labels for voltage and power details from the packet of items supplied and attach them.
- Check the reference voltage between test point ”P9” and ”MS” (ground, secondary);

  $U_{Nominal}$ = 48 V ± 0.5 V

CAUTION	**To ensure compliance with DHHS regulations, do not change the factory setting.**

Checking the voltages on sweep board AP1.1 / AP1.4

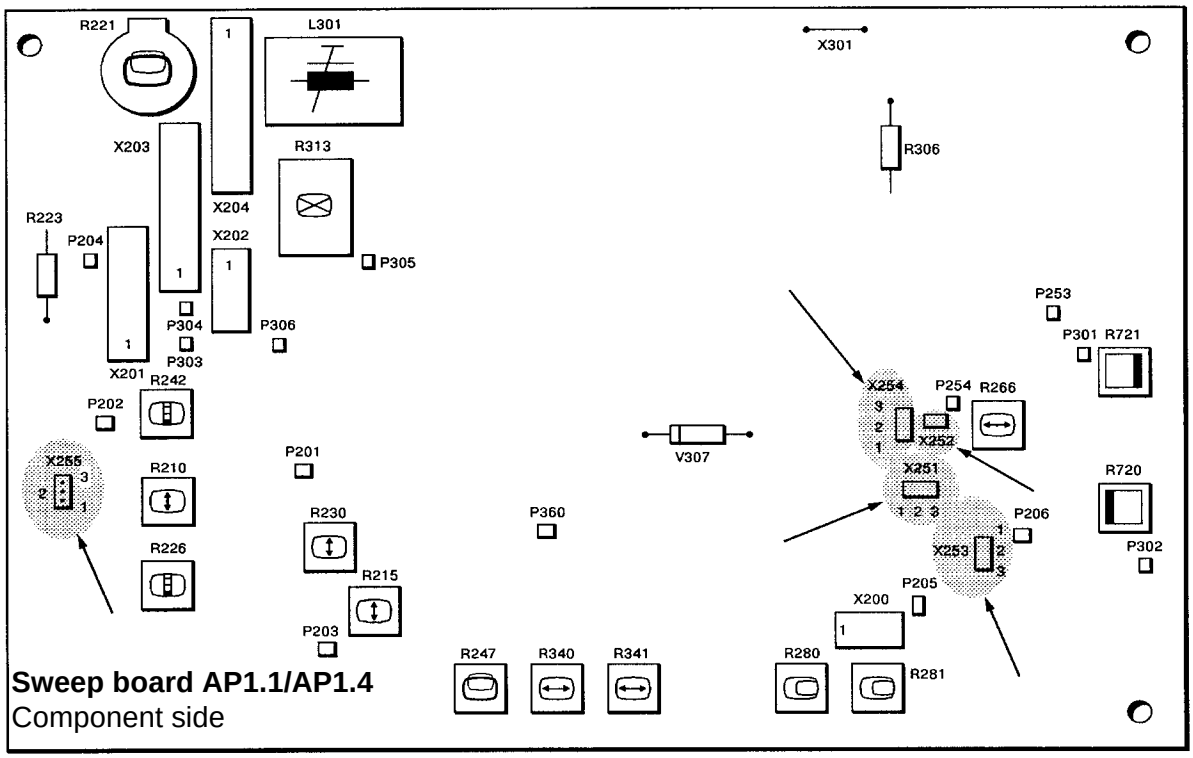


Sweep board AP1.1/AP1.4
Component side

- Check the operating voltages on the sweep board:

Test point on the sweep board	**Operating voltage**
X203.7	+ 48 V ± 0.5 V
X203.1	- 17 V ± 1.0 V
X203.2	- 6.4 V ± 0.1 V
X203.5	+ 16 V ± 1 V
X203.6	+ 29 V ± 1 V
X202.4	+ 750 V to + 850 V
X201.1	- 120 V to - 145 V
X201.3	+ 130 V to + 160 V
P301	+ 12 V ± 0.6 V
All voltages measured with respect to 0 V, secondary e.g. X203.3 X203.4	0 V

Setting the horizontal sweep to 525 lines / 60 and 120 Hz



Sweep board AP1.1/AP1.4
Component side

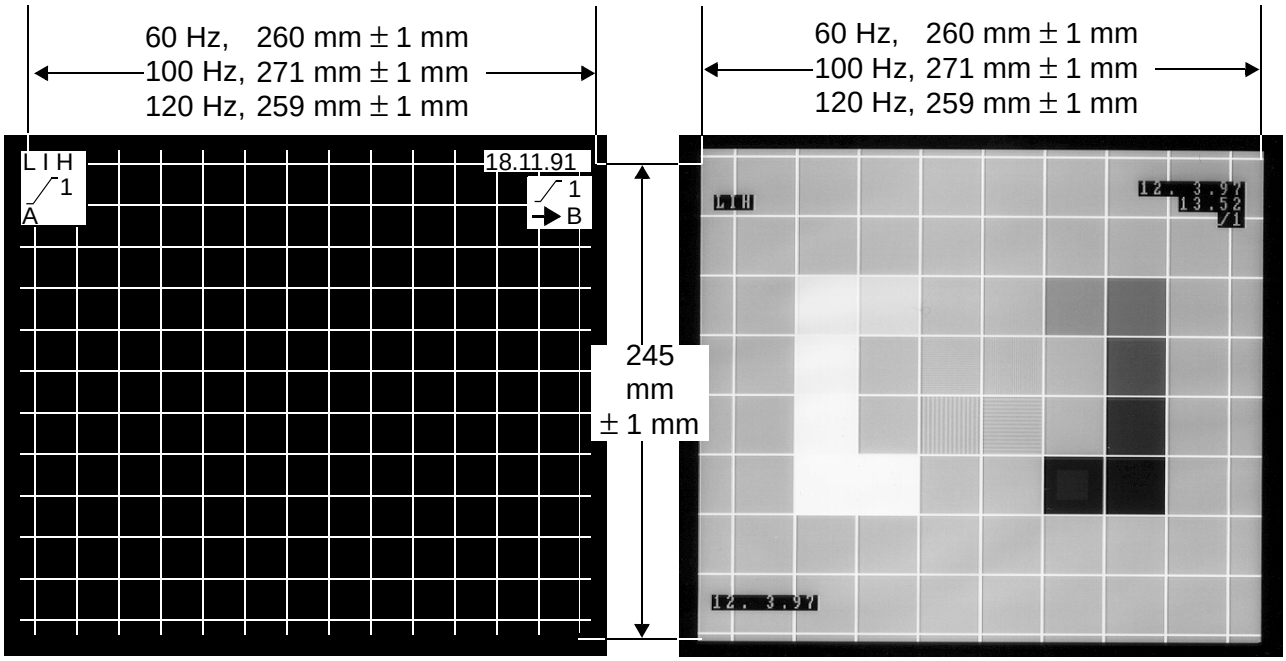
CAUTION	**Allow 30 minutes warm-up time.**
NOTICE	**In the following, the adjustment elements used are identified by consecutive numbers. A label on the transformer shielding facilitates location of the adjustment elements.**

- Select the 525 line /60 or 120 Hz grid pattern on the SIREMOBIL 2000 in the service menu (see test patterns).
- For X-ray units with VIDEOMED D and without MEMOSKOP, use the grid pattern of the VIDEOMED D.
  or
- For X-ray systems equipped with a MEMOSKOP 50, call up the SMPTE test pattern from the MEMOSKOP.
  or
- For X-ray systems equipped with a MEMOSKOP C/C-E, call up the SMPTE test pattern from the MEMOSKOP C/CE.

Before performing the grid settings, check the V synchronization for correct functioning of the automatic standards switch, otherwise problems may occur.

V freq.

- Connect the CH1 channel of an oscilloscope to test point ”P202”.
- Connect the ”P201” test point to ”0V”; this switches off the V-synchronization.
- With R210 set the V frequency to a period of 10.4 to 10.5ms at 120 Hz and/or 20.8 to 21.2ms at 60 Hz.
- Remove the P201 - 0V test connection.



Grid test pattern SMPTE Test pattern

H-synchronization
- Interconnect the pins of jumper X252 on the AP board to switch off the H-synchronization.
- Set the **H-frequency** with adjuster R266 so that the image is at minimum tilt.
- Disconnect jumper X252 again.
- Check the H-synchronization on the monitor screen.
- Set the electronic mask on the right with R721 and on the left with R720 to cover the largest picture frame, so that there are no picture limitations during adjustment.

H-position
- Set the H-position with adjuster R281, i.e. set the grid pattern centrally with respect to the picture tube screen.

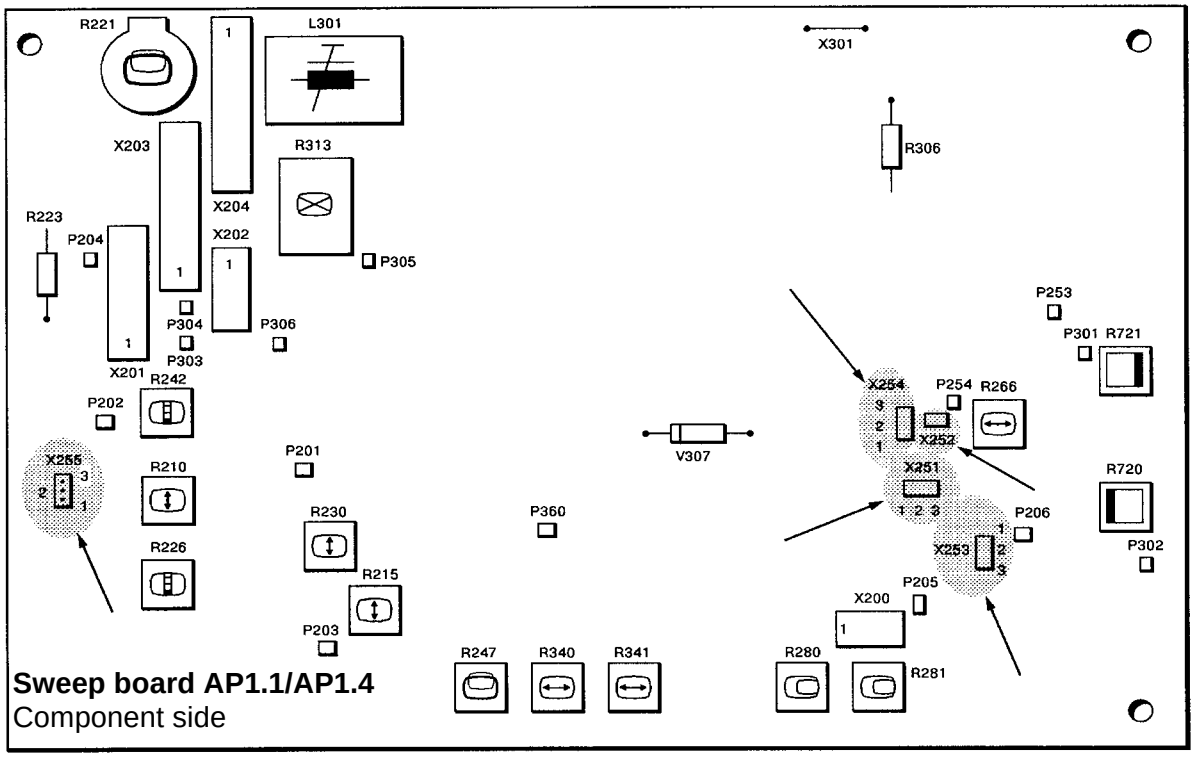
H-amplitude
- Set the H-amplitude to 13.1 grid units in the grid test pattern or set the visible horizontal image field (matrix memory) with adjuster R341 to the size specified in the pattern in the SMPTE test pattern.

H-linearity
- Set the H-linearity with adjuster L301 to the same size grid squares.
- If necessary, repeat the **H-position, H-amplitude** and **H-linearity** adjustments.

electron. H-screen
- Adjust the H-mask with adjuster R720 so that the image information on the left is covered by max. 1mm.

left/right Adjust the H-mask with adjuster R721 so that the image information on the right is covered by max. 1mm.

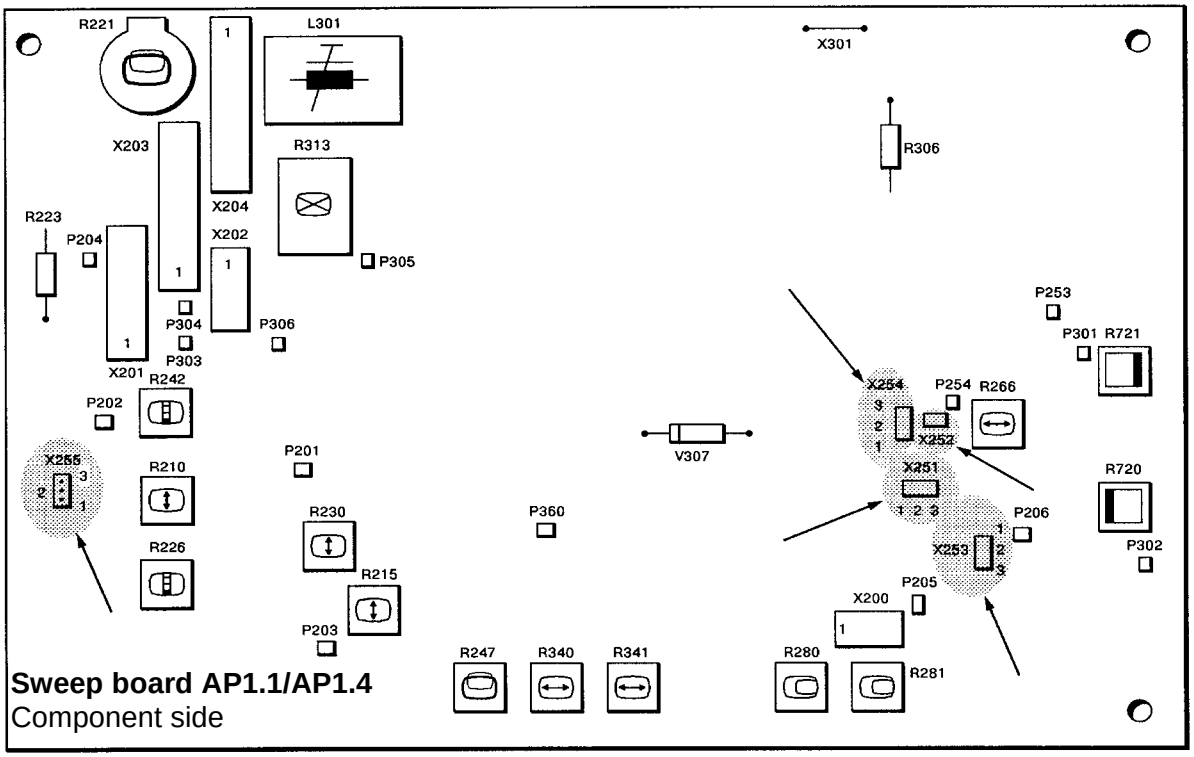
Setting the vertical sweep to 525 lines / 60 and 120 Hz



Sweep board AP1.1/AP1.4
Component side

V-amplitude	Using adjuster R230, set the **V-amplitude** to 12 grid units.
or	In the SMPTE test image, set the visible vertical image field (matrix memory) with adjuster R230 to the size of 245 mm ± 1mm specified in the figure (page 4-2).
V-position	Using adjuster R221, set the **V-position**, i.e. set the grid pattern centrally with respect to the picture tube screen.
V-linearity	Using adjuster R226, set the **V-linearity** so that the grid squares are the same size over the entire screen.
	If necessary, repeat the **V-position, V-amplitude** and **V-linearity** adjustments.

Setting the horizontal sweep to 625 lines / 100 Hz



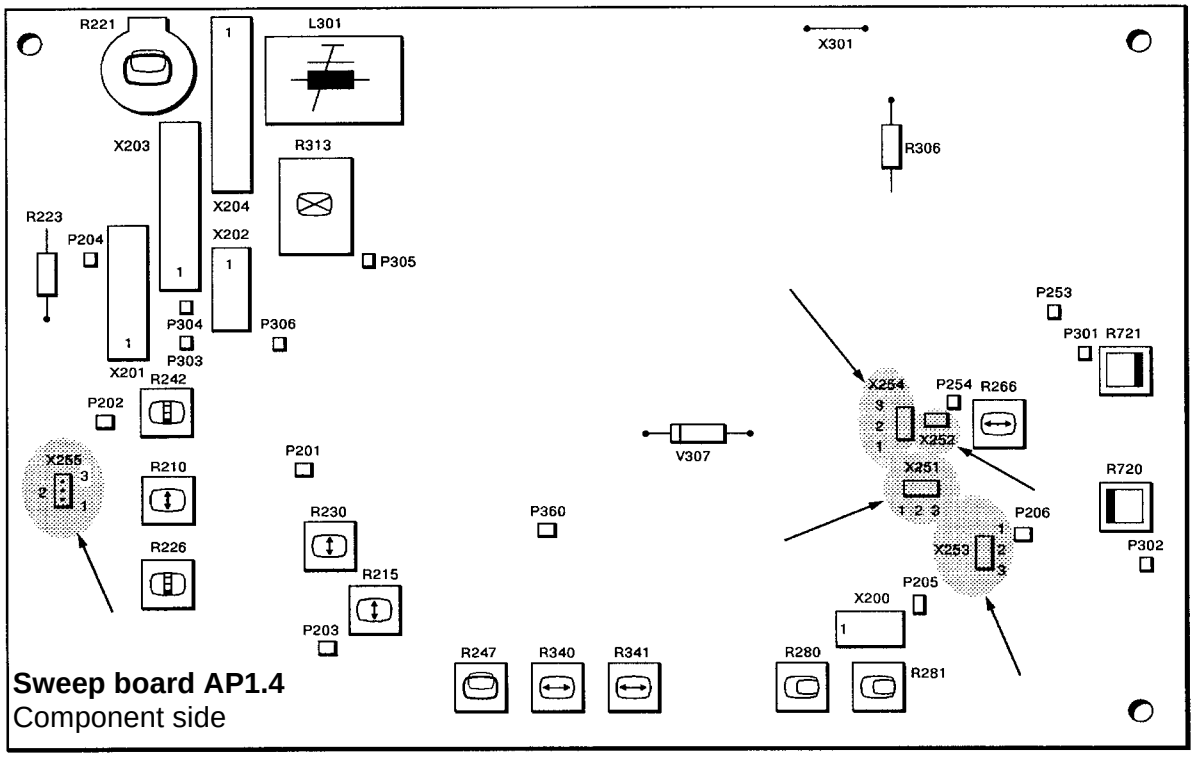
Sweep board AP1.1/AP1.4
Component side

CAUTION	**Allow 30 minutes warm-up time.**
NOTICE	**In the following, the adjustment elements used are identified by consecutive numbers.** **A label on the transformer shielding facilitates location of the adjustment elements.**

- Select the 625 line / 100 Hz grid pattern on the SIREMOBIL 2000 in the Service menu (see test patterns).
- For X-ray systems with Videomed D and without MEMOSKOP, use the grid pattern of the VIDEOMED D.
  or
- For X-ray systems equipped with a MEMOSKOP 50, call up the SMPTE test pattern from the MEMOSKOP.
  or
- For X-ray systems equipped with a MEMOSKOP C/C-E, call up the SMPTE test pattern from the MEMOSKOP C\CE.

Before performing the grid settings, check the V synchronization for correct functioning of the automatic standards switch, otherwise problems may occur.

V-frequency
- Connect channel CH1 of an oscilloscope to test point "P202".
- Connect test point "P201" to "0 V". This switches off the V-synchronization.
- Using adjuster R210, set the V-frequency to a period of 10.4 ms to 10.5 ms.
- Remove the P201 - 0 V connection. If the adjustment range is not sufficient, use adjuster R230.



Sweep board AP1.4
Component side

H-synchronization

- Interconnect the pins of jumper X252 on the AP board to turn off the H-synchronization.
- Using adjuster R266, set the H-frequency so that the image is at minimum tilt.
- Disconnect jumper X252 again.
  Check the H-synchronization on the monitor screen.
- Set the electronic picture on the right with R721 and on the left with R720 to cover the largest field, so that there are no picture limitations during adjustment.

H-position

- Set the H-position with adjuster R280, i.e. set the grid pattern centrally with respect to the picture tube screen.

H-amplitude

- Set the H-amplitude to 13.1 grid units in the grid test pattern or set the visible horizontal image field (matrix memory) with adjuster R340 to the size specified in the figure (page 4-2).

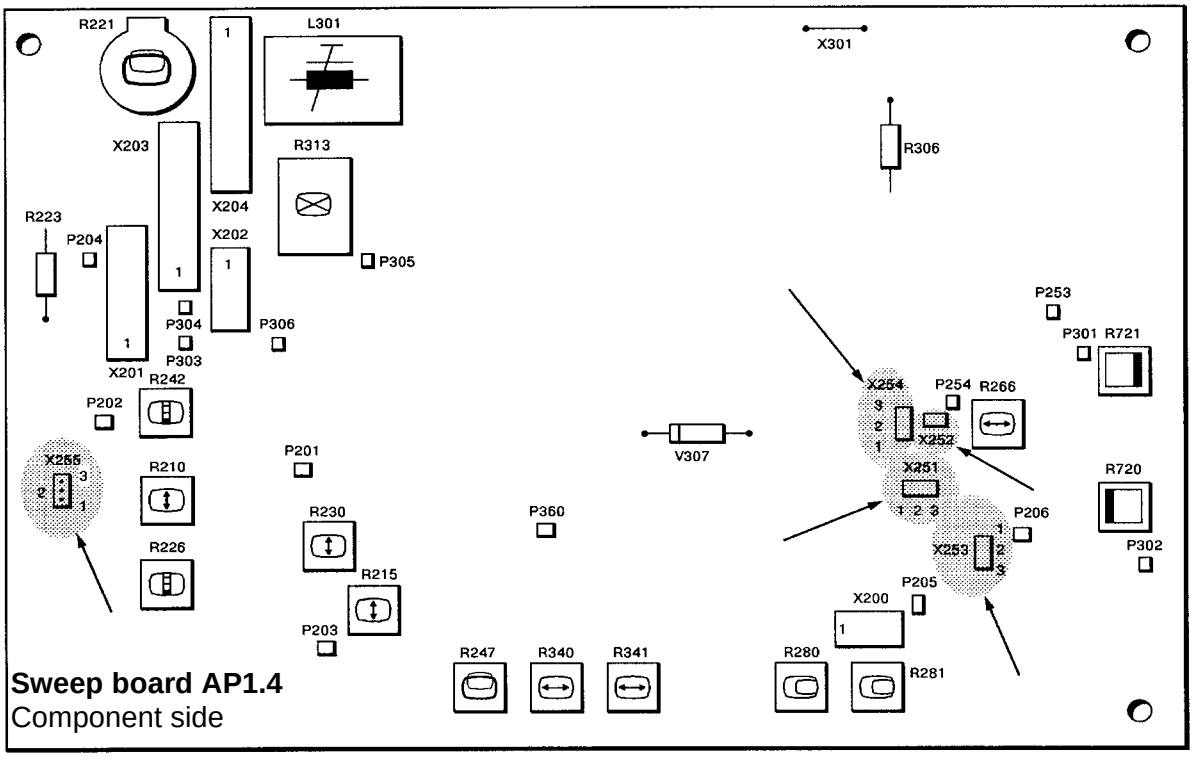
H-linearity

- If required, set the H-linearity to the same size grid squares using adjuster L301.
- If necessary, repeat the **H-position, H-amplitude** and **H-linearity** adjustments.

electron. H-screen left/right

- Adjust the H-mask with adjuster R720 so that the image information on the left side is covered by max. 1mm.
- Adjust the H-mask with adjuster R721 so that the image information on the right is covered by max. 1mm.

Setting the vertical sweep to 625 lines/100Hz



Sweep board AP1.4
Component side

V-amplitude

- Using adjuster R215 set the V-amplitude to 12 grid units. If the adjustment range is not sufficient, use adjuster R230. In the SMPTE test pattern, set the visible vertical image field (matrix memory) to the size specified in the figure (page 4-2).

V-position

- Using adjuster R247, set the grid pattern centrally with respect to the picture tube screen. If the adjustment range is not sufficient, use adjuster R221.

V-linearity

- Using adjuster R242, set the V-linearity so that the grid squares are the same size over the entire screen. If the adjustment range is not sufficient, use adjuster R226.
- If necessary, repeat the **V-position, V-amplitude** and **V-linearity** adjustments.

Checking / setting the focus

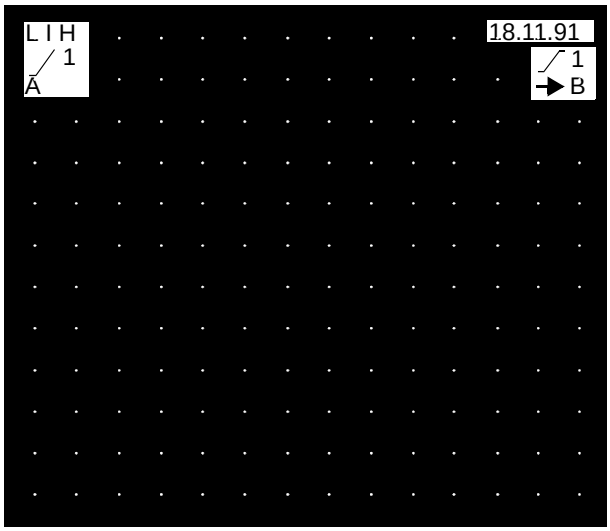


Fig. 1

- Cover the room lighting sensor on the operating console.
- Call up the dot pattern from the VIDEOMED D as test image.
  If the VIDEOMED D is not present, the dot pattern can be connected from the monitor multinorm test box to the monitor.

Check:

Assess the dot pattern over the entire image field.
The dots should be as nearly rectangular as possible. The contrast and/or the brightness or the video amplitude should not be too high, so that the picture tube does not burn out. The dots should be recognizable individually in the two interlaced displays.

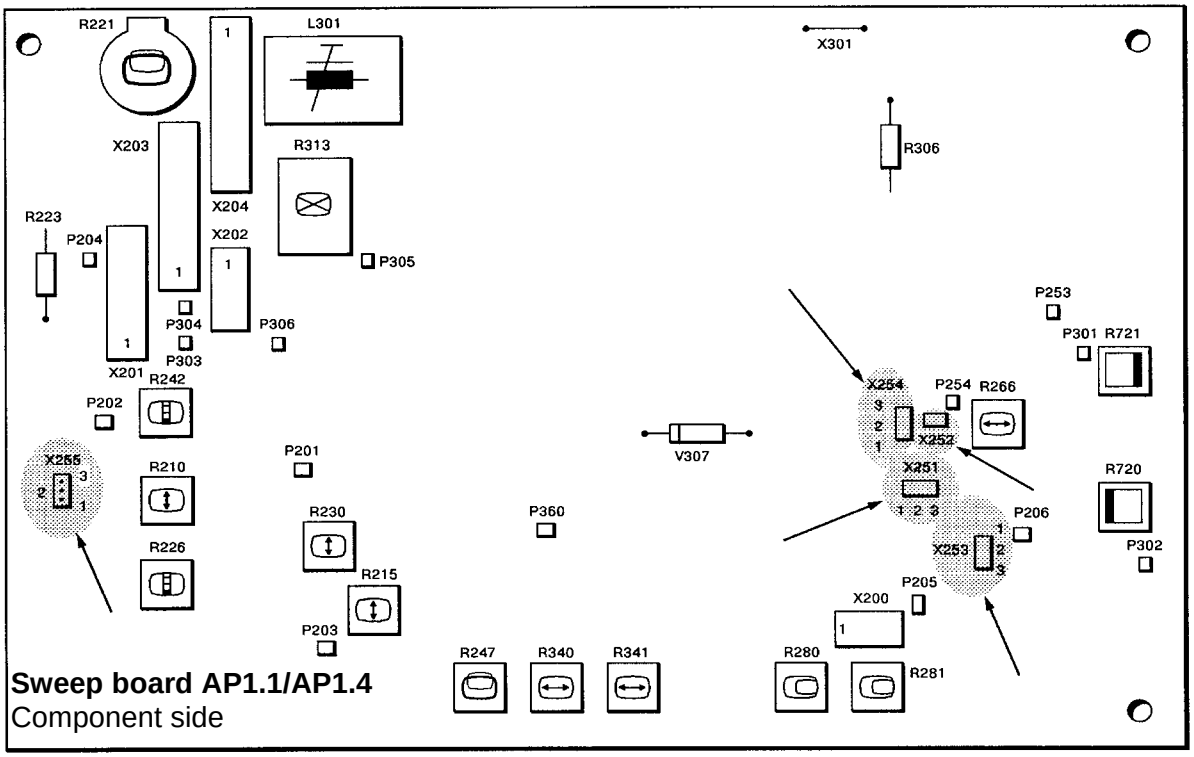
correct (optimal) not correct

Adjustment:

- If necessary, you can adjust the dots to maximum sharpness over the entire image field with adjuster R313.

NOTICE	**If the test pattern according to Fig. 1 cannot be called up, call up the SMPTE test pattern and evaluate the focus in the center of the image and the text on the edge of the image.**

Checking the high voltage cut-off operation



Sweep board AP1.1/AP1.4
Component side

The high voltage of the picture tube must switch off in the range of U_H = 20.0 kV to 21.0 kV!

- To comply with DHHS regulations, a function check must be made on equipment in the USA after PC boards or the picture tube have been replaced.
- Disconnect the power plug.
- Connect a voltmeter:
  - ground the probe tip connection to the high voltage cage.
  - connect the 30 kV probe tip to the high-voltage connection of the picture tube.
- Call up the VIDEOMED D gray-shade test image in service mode (Fig. page 2-2).
- On the AP1.4 board, connect the cathode of an auxiliary diode (e.g. 1N4007) to the cathode of diode V307.
- Feed in an adjustable DC voltage (+ at anode) via the auxiliary diode of between 0 V and 10 V (1.0 A) to diode V307.
- Connect the power plug and switch on the monitor.
- Slowly increase the DC voltage fed to diode V307 from 0V until the high-voltage cut-off responds between 20.0 and 21.0 kV.

Preparation for setting the brightness and contrast

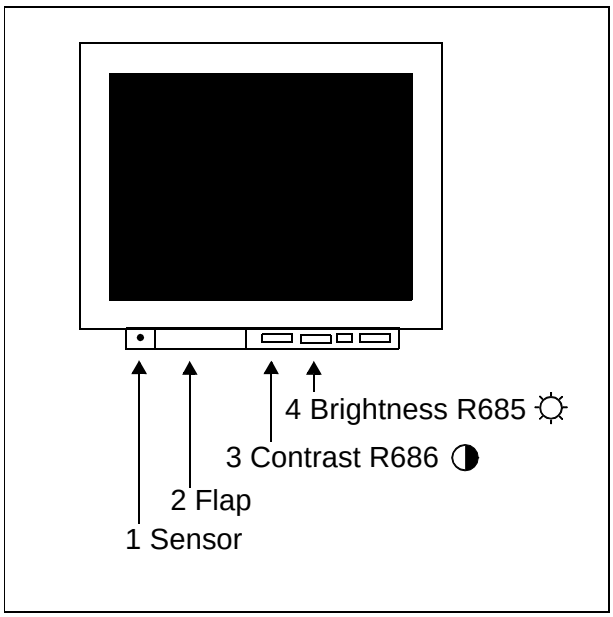
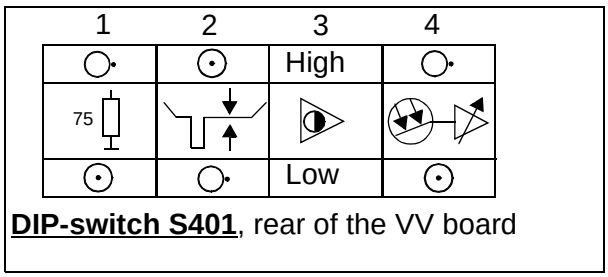
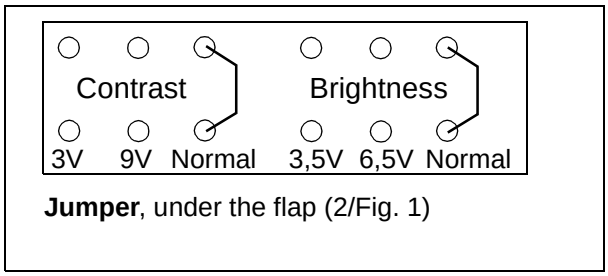


Fig. 1



DIP-switch S401, rear of the VV board

Fig. 2a



Jumper, under the flap (2/Fig. 1)

Fig. 2

Notes:

- If the picture tube or the video amplifier has been replaced, first adjust the video amplifier (see page 6-1).
- For the following luminance measurements, no external light must reach the monitor screen or it will distort the measurement.
  Darken the room or cover the monitor screen outside the measuring field (e.g. with a black cover.)
- When replacing the video amplifier (VV) board, ensure that you have switched DIP switch S401/3 on board part no. 30 15 992 XE009 to ”low” (low gain). (Fig. 2a).
- If the system is equipped with dual monitors, perform the following settings on both monitors. This synchronizes the monitors.

- Check the 75 ohm termination for the video input (S401/1 ”⊙” Fig. 2a).
- Cover the sensor (1/Fig. 1) on the monitor or switch off the sensor with switch S401/4 on the rear of the VV board in position ”○” (Fig. 2).
- Open the flap (2/Fig. 1) on the left side of the control panel by lifting it open with a screwdriver.
  This provides access to the jumpers for alignment of the video amplifier.
- The jumpers for "contrast" and "brightness" must be in "normal" position (Fig. 2).
  The ”Contrast, R686 ◑” and ”Brightness, R685 ☼” controls are active.
  To adjust them, use the service key (page 1-4).
- Set the contrast control R686 ◑ (3/Fig. 1) to maximum contrast.

Brightness and contrast with the "vertical beam" test pattern

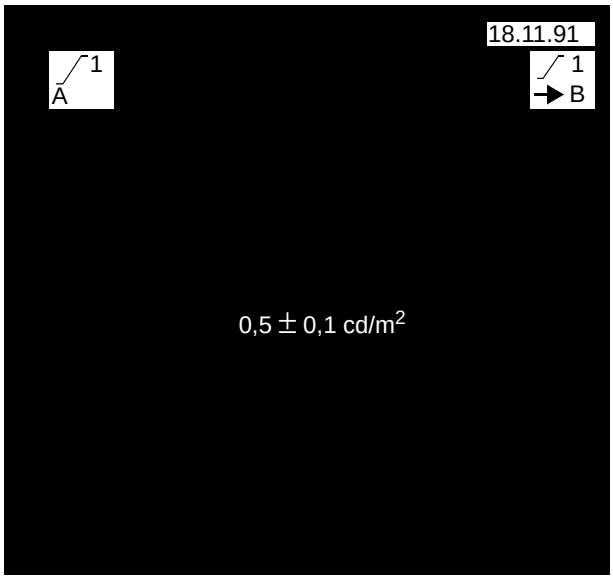


Fig. 3

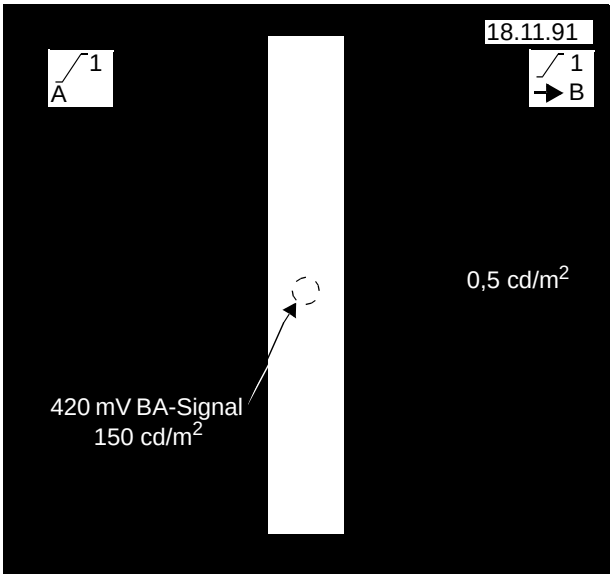


Fig. 4

NOTICE **The adjustment applies for MEMOSKOP 2/3/50 and SUB as well as for adjustments using the test box and for MEMOSKOP C/C-E up to software version VA00B.**

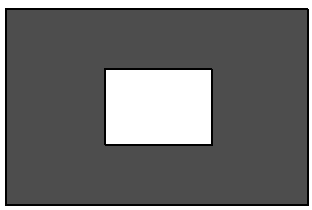
- Set the contrast to step 1 (linear) on the TV carriage keyboard (LUT=1).

Brightness

- Call up the 0% video signal dark memory test pattern (Fig. 3).

For systems on which you cannot call up test patterns from the MEMOSKOP in order to adjust the basic brightness and luminance, use the monitor multinorm testbox as the test signal transmitter.

Select the test pattern with the white window instead of the vertical white bar. The black test pattern results from an input of 0% B signal on the Service PC. The BA signal amplitude in the window must be more than 420 mV ± 10 mV (this can be adjusted via menu on the PC), corresponding to 55% video signal in the BAS.
(B-Signal 370 mV, A-Signal 50 mV)



- Use the Mavo monitor to measure the luminance.
- Using brightness control R685 ☼ (Fig. 1), set a luminance of 0.5 ± 0.1 cd/m^2 at the center of the stored test pattern (Fig. 3)
  (Measure in black for the window test pattern.)

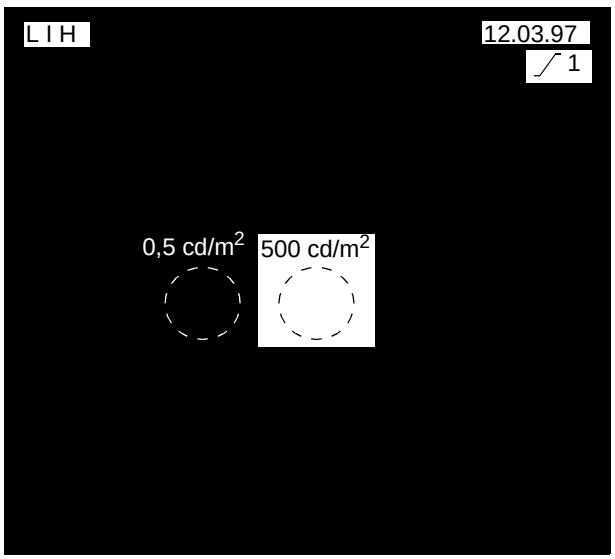
Contrast

- Call up the stored white bar test pattern (Fig. 4).
- Using contrast control R686 ◑ set a luminance of 150 ± 5 cd/m^2 in the white bar (↑/Fig.4) of the stored test pattern.

- Repeat the set-up procedures for brightness and contrast until the specified luminance values are obtained.
- Remove the cover of the room lighting sensor (1/Fig. 1) or reset the room lighting sensor to"⊙" using switch S401/4.
- If a luminance of ≥ 150 cd/m^2 is no longer obtained when adjusting with contrast control R686, realign the video amplifier VV (refer to page 6-1), or replace the picture tube if it is worn out.

Brightness and contrast with the "square" test pattern

NOTICE	**This adjustment applies for MEMOSKOP C/C-E as of software version > VA00B.**



square available as of SW version > VA00B of Memoskop C/C-E

- Set the contrast to level 1 (LUT = 1) on the keyboard of the TV trolley.
- Call up the "square" test pattern on the MEMOSKOP C/C-E.
- Start-up the Mavo monitor to measure the luminance.
- Using the brightness adjustment element R685 ☼ (page 5-1/Fig. 1), measure in the black area and set a luminance of 0.5 cd/m^2 ± 0.1 cd/m^2 .
- Using the contrast adjustment element R686 ◑ , measure in the center of the white field and set a luminance of 500 cd/m^2 ± 20 cd/m^2 .
- Repeat the brightness and contrast adjustments until the luminance values indicated have been attained.
- If a luminance of 500 cd/m^2 ± 20 cd/m^2 cannot be attained, readjust the video amplifier VV according to chapter 6.
  If after readjusting in accordance with chapter 6, a luminance of only 300 cd/m^2 to 480 cd/m^2 is attained, continue the brightness and contrast adjustment in accordance with pages 5-1 through 5-3. (150 cd/m^2 - setting)
- Remove the cover of the room lighting sensor (page 5-1/Fig. 1), or reset the room lighting sensor to "⊙" using switch S401/4.

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Luminance / Preparations

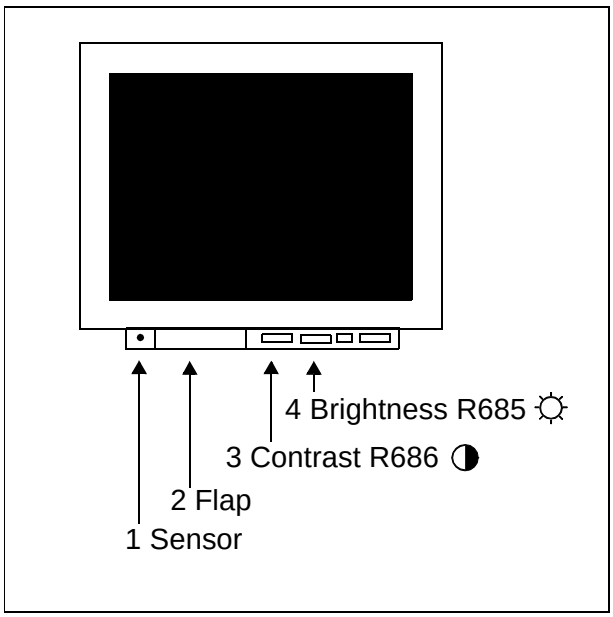
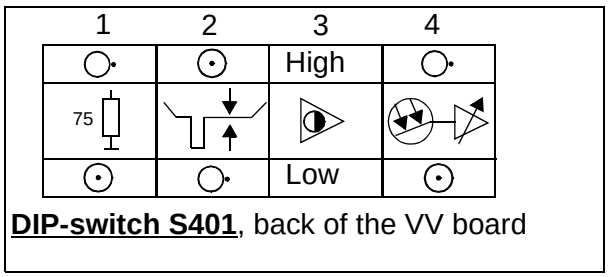
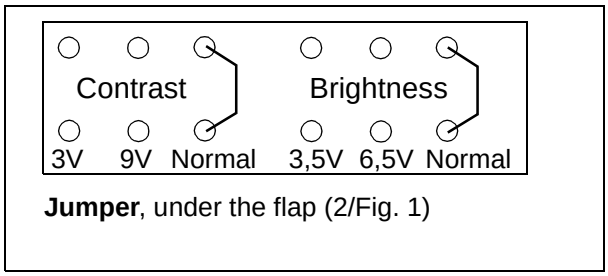


Fig. 1



DIP-switch S401, back of the VV board

Fig. 2a



Jumper, under the flap (2/Fig. 1)

Fig. 2

Checking the luminance of the picture tube

Before setting the monitor, check if a minimum luminance of ≥ 300 cd/m^2 can be obtained for the picture tube. If not, the settings for the video amplifier are not possible.

- Call up the stored test image with the white bar (Chapt. 4/Fig. 4).
- Select contrast level 4 (LUT 4) on the keyboard of the TV trolley.

For systems on which you can not call up test patterns from the MEMOSKOP in order to adjust the basic brightness and the luminance, use the monitor multinorm testbox as the signal transmitter.
In this case, you must select the test image with the white window according to page 5-2 instead of the vertical white bar.
The signal amplitude in the window must be 1000 mV ± 50 mV, adjustable via the menu on the PC. This corresponds to approx. 140% video signal in the BAS.

- Using the Mavo monitor, measure the luminance in the center of the white bar.
  If the minimum luminance of ≥ 300 cd/m^2 is not obtained, the picture tube is worn out and is distorting the image quality.

Adjusting the video amplifier

Preparation

Prerequisite: The luminance test of the picture tube produced a minimum luminance of ≥ 300cd/m^2.

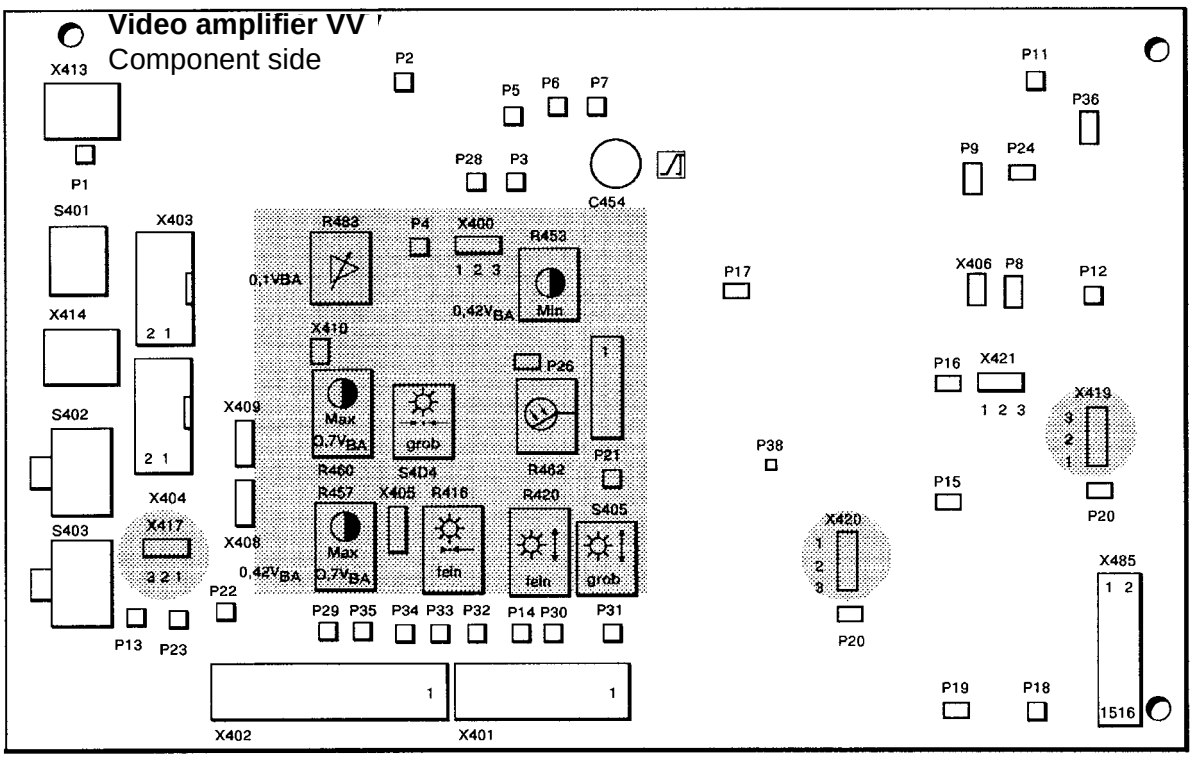
Preparation

Notes:

- Adjustment of the video amplifier is only necessary when the amplifier or the picture tube has been replaced or when the required luminance has not been obtained.
- During the following luminance measurements, no external light must reach the monitor screen or it will distort the measurement.

Darken the room or cover the monitor screen outside the measuring field (e.g. with a black cover).

- When replacing the VV board, ensure that the DIP switch S401/3 on board part no. 30 15 992 XE009, is set to ”low” (low gain). (Fig. 2a)



Video amplifier VV, component side

- Check the 75 ohm termination for the video input (S401/1 ”⊙”, Fig. 2a).
- Cover the room lighting sensor (1/Fig. 1) on the monitor or switch off the sensor with S401/4 in position ”◯ ” (Fig. 2a).
- Open the flap (2/Fig. 1) on the left side of the control panel by lifting it open with a screwdriver (Fig. 5.1).
  This provides access to the jumpers for alignment of the video amplifier.
- Insert the jumpers for ”Contrast” and ”Brightness” in”normal” position (Fig. 2).
- The ”Contrast, R686” (3/Fig. 1) and ”Brightness, R685” controls (4/Fig. 1) are active. To adjust them, use the service key (page 1-4)!
- Unscrew the locking screw on the video amplifier.
- Pull the video amplifier out to the service position and hang it on the recesses provided.
- Set the contrast levels (LUT=1) to linear on the MEMOSKOP keyboard.

Luminance and gain

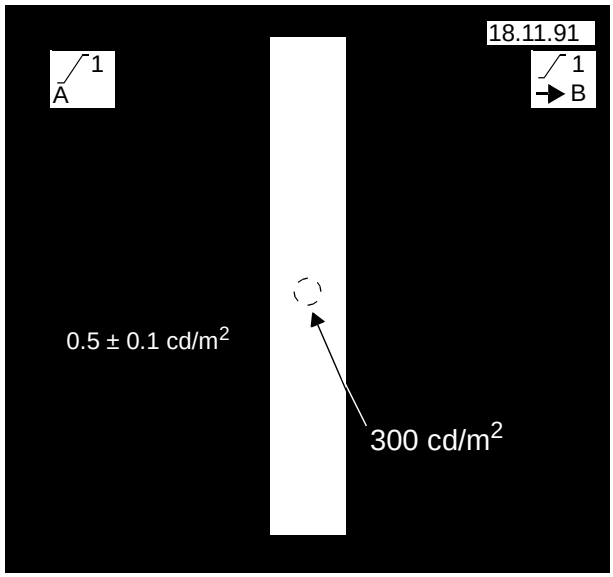
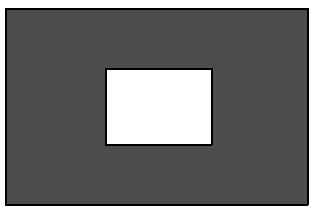


Fig. 3

- Call up the white bar memory test pattern (Fig. 3.)

NOTICE

For systems on which you cannot call up test patterns from the MEMOSKOP in order to adjust the basic brightness and luminance, use the monitor multinorm testbox as the test signal transmitter.
In this case, you must select the test image with the white window instead of the vertical white bar.
The BA signal amplitude in the window must be 420 mV ± 10 mV, adjustable via the menu on the PC. This corresponds to approx. 55% video signal in the BAS.
(370 mV B-Signal, 50 mV A-Signal)



- Use the Mavo monitor to measure the luminance.
- Set the front contrast controller R686 ◑ (chapter 5 / Fig. 1/3) to the left limit stop (minimal contrast).
- Set the front brightness controller R685 ☼ (chapter 5 / Fig. 1/4) to the left limit stop (minimal brightness).
- Set controllers R453 ◑ $_{min}$, R457 ◑ $_{max}$ and R483 on the VV board to the right limit stop, viewed from the component side.
  The image signal on the picture tube must not be visible anymore.
- Set the jumpers X420 and X421 to position 2-3.

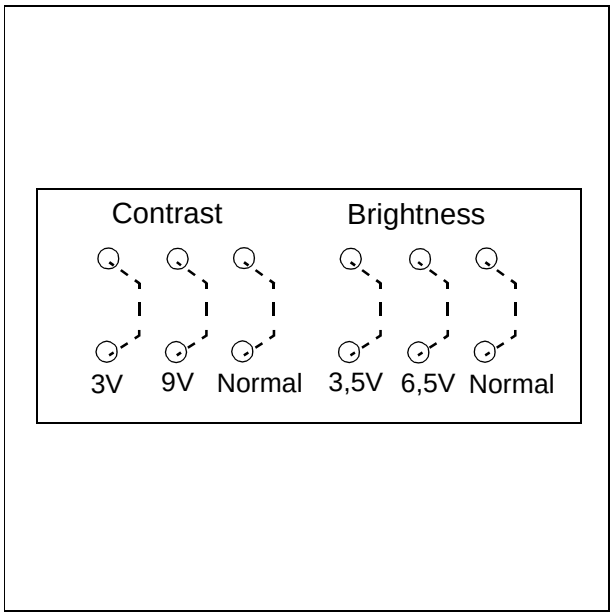


Fig. 4

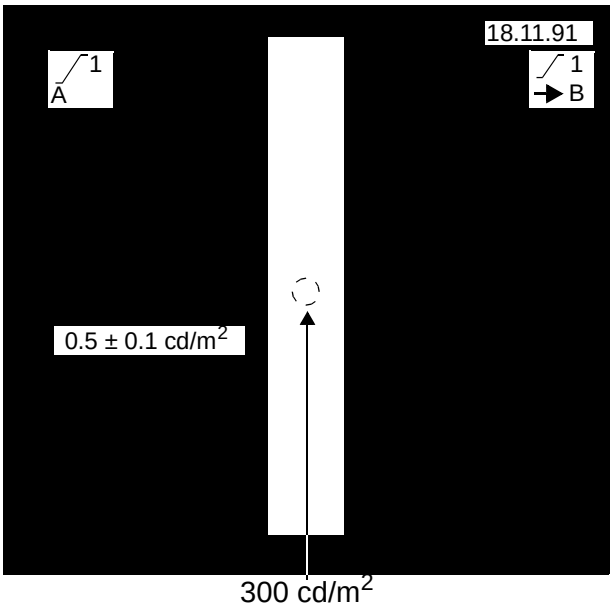


Fig. 5

- Cover the sensor (1/Fig. 1) on the monitor or switch it off by positioning the switch on the back of the board in the "○" position.
- Set the DIP switch S401/3 to "high"(high amplification).

Basic brightness, pre-setting, synchronous operation

- Set a basic luminance of approx 0.5 ± 0.05 cd/m^2 in the middle of the white bar with the S404 switch (☼ →•← coarse) within switch levels 8 to 15 and with adjuster R416 (☼ →•← fine).
- Reconnect the **"brightness"** jumper to "3.5V"(Fig. 4)
  The contrast jumper is in **"normal"** position.
- Set 300 ± 10 cd/m^2 with the S405 switch within switch levels 8 to 15 and with adjuster R420 (☼ ↓↑) in the center of the screen (Fig. 5).

NOTICE

If a minimum luminance of 300 cd/m2 is not obtained during alignment of the video amplifier in the white bar of the memory test image, the cathode of the picture tube is depleted. This adversely affects the image quality. The picture tube should then be replaced.

Basic brightness

- Reconnect the **"brightness"** jumper to pos. "6.5 V" (Fig. 4).
- Set a basic luminance of approx. 0.5 ± 0.05 cd/m^2 with switch S404 (☼ →•← coarse) in the center of the white bar within switch levels 0 to 7 and with adjuster R416 (☼ →•← fine).

Contrast

- Set adjuster R453 ◑ $_{min}$ and R457 ◑ $_{max}$ to the right limit stop.
- Set adjuster R686 ◑ (3/Fig. 1) to the left limit stop.
- Set the **"brightness"** jumper to "normal".
- Set a luminance of 10 cd/m^2 with the front brightness adjuster R685 ☼ (for measuring the subsequent basic video adjustments).
  This corresponds to roughly 100 mV BA on the cathode of the picture tube.
- Set a luminance in the white bar of 10.3 cd/m^2 (higher by 0.3 ± 0.05 cd/m^2) with adjuster R483.
  This corresponds to roughly 100 mV BA on the cathode of the picture tube.
- Adjust the **"brightness"** jumper to "6.5 V" (Fig. 4).

Contrast$_{max}$

- Reconnect the jumper for **"Contrast"** to "3V" (Fig. 4).
- Using adjuster R457 ◑ $_{max}$, set a luminance of 320 cd/m2 $\pm$ 5 cd/m^2 in the white bar.

Contrast$_{min}$

- Change the jumpers for **"Contrast"** to "9 V" (Fig. 4).
  The brightness jumper must remain at "6.5 V".
- Using adjuster R453 ◑ $_{min}$, set a luminance of 16 ± 0.5 cd/m^2 in the white bar.
- Repeat the ◑ $_{min}$ and ◑ $_{max}$ alignment procedures until the luminance values 320 cd/m^2 at 3 V and 16 cd/m^2 at 9 V are obtained.
- Reconnect the jumpers for **"Contrast"** and **"Brightness"** to "normal" (Fig. 4).
- Set the jumpers X420 and X421 back to position 1-2.
- Perform the brightness and contrast adjustments according to chapter 5.
- Remove the cover of the room lighting sensor (1/Fig. 1) or switch on the sensor with S401/4 in position "⊙".

Sensor setting

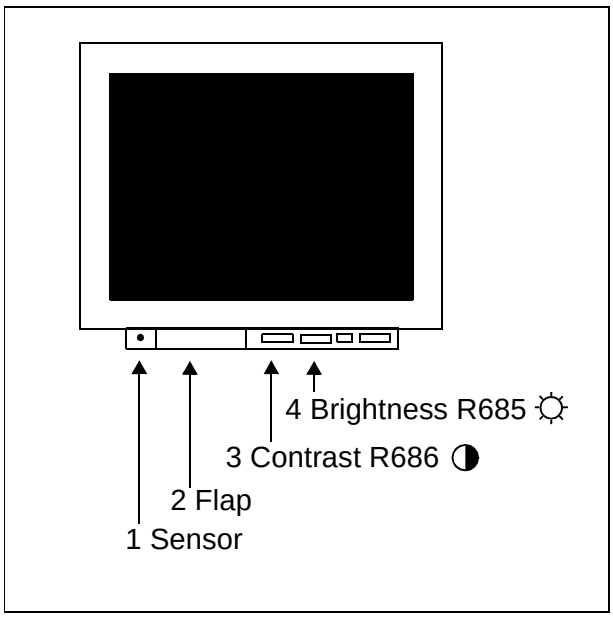


Fig. 6

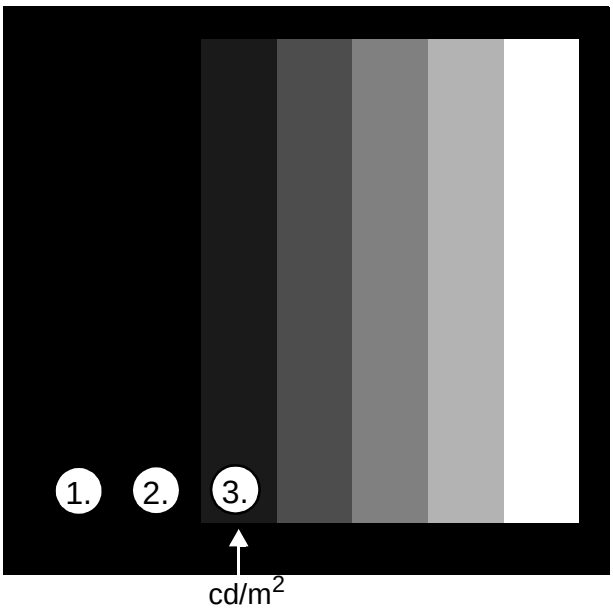


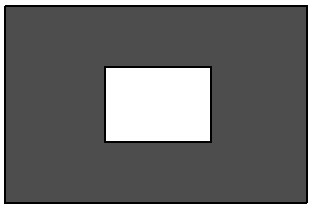
Fig. 7

- Remove jumper X419 (see Chap. 1) on the video amplifier.
- Call up the memory test pattern with the linear gray shade scale (Fig. 7).

For systems on which you cannot call up the gray shade steps from the MEMOSKOP, use the monitor multinorm testbox as the signal transmitter.

You must then select the white window.

Adjust the test image from the multinorm test box to a B-amplitude of 230 mV ± 5mV, (adjustable in the menu on the PC).



- Set the contrast to level 1 (LUT=1) on the keyboard of the monitor trolley.
- Measure and document the luminance of gray shade step 3 via the Mavo monitor in a darkened room (↑/Fig.5.7) in the memory test image or in the white window.
- Insert the jumper in position 2-3 on the video amplifier at X419 (see Chap. 1).
- Remove the cover from the sensor (1) and/or switch the sensor with the S401/4 switch to "⊙".
- Set the value of the luminance in the 3rd grey shade step or in the white window with adjuster R462 (see Chap. 1) to a value that is 1.5 times higher than that of the first measurement.

Ex.: If 30 cd/m^2 was measured the first time, the luminance must be adjusted to 45 cd/m^2 with a jumper position of X419/2-3 and with switch S401/4 set to "⊙".

NOTICE

If adjustment element R462 is set at the right limit stop (viewed from the component side) the room lighting control will be less sensitive.

- Remove the jumper on the video amplifier at X419 and connect it to 1-2. Observe the changes in the luminance on the monitor.
- Reconnect jumper X419 to 1-2.

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- Ensure that cable harnesses and separately installed cables do not touch metal edges or components radiating heat.
- Check the clearances and creepage distances required and ensure compliance.
- The clearances must be ≥ 2.5 mm and the creepage distance ≥4 mm from the power-side connection to the primary side of the transformer.

  The clearances must be 5 mm and the creepage distance ≥ 8 mm from the live and grounded parts of the primary side of the transformer to the live and grounded parts of the secondary side.

  Check the insulation strength with a test voltage of U_{eff} = 1500 V between the power supply poles and the metal parts of the units, such as the frame, connection sleeves, etc.
- Protective conductor test
  After completing all jobs and attaching the cover, perform the protective conductor test according to TI 236, print number RA0-000.012.20.01.01.
  (replaced by ARTD, Part 2, ARTD-002.731.17.01...)

7 - 2 Protective ground wire insulation strength check

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Changes as compared to previous version 8 - 1

Chapter 0	Cover sheet, Revisions status and Table of Contents newly generated.
Chapter 1-1	$\underline{\leq}$ 300 dc/m^2 in $\underline{\geq}$ 300 dc/m^2 changed
Chapter 1-7	Tables new inserted
Chapter 1-12	Tables new inserted
Chapter 6-5	Paragraph Contrast$_{min}$: line new inserted
Chapter 6-6	Drawing delete

TD PS 24/ Arnold

SMS Iselin

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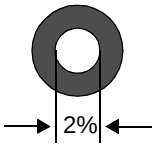
RX52-060.061.02.01...	Test template for 60 Hz / 525 line monitor
RX52-060.061.02.01...	Test template for 100 Hz / 625 line monitor
RX52-060.061.02.01...	Test template for 120 Hz / 525 line monitor

Maximum permissible tolerances for linearity and amplitude

Inside the blanking circle



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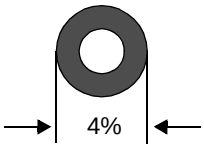

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